

Engineering
Library

MOTOR AGE

FOR AUTOMOTIVE SERVICEMEN

A CHILTON PUBLICATION

MAY 1941

THIS ISSUE

•
Double Shooting
Hydraulic Brakes
Bill Toboldt

•
Wheel Alinement
Service on the
Nash
Bob Hankinson

•
Servicing Buick's
vacuum Starting
Switch

•
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Tough ... BUT OH SO GENTLE



TOUGH ON OIL-PUMPING
GENTLE ON CYLINDER WALLS

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Stan Ekman

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STEEL-VENT PISTON RINGS

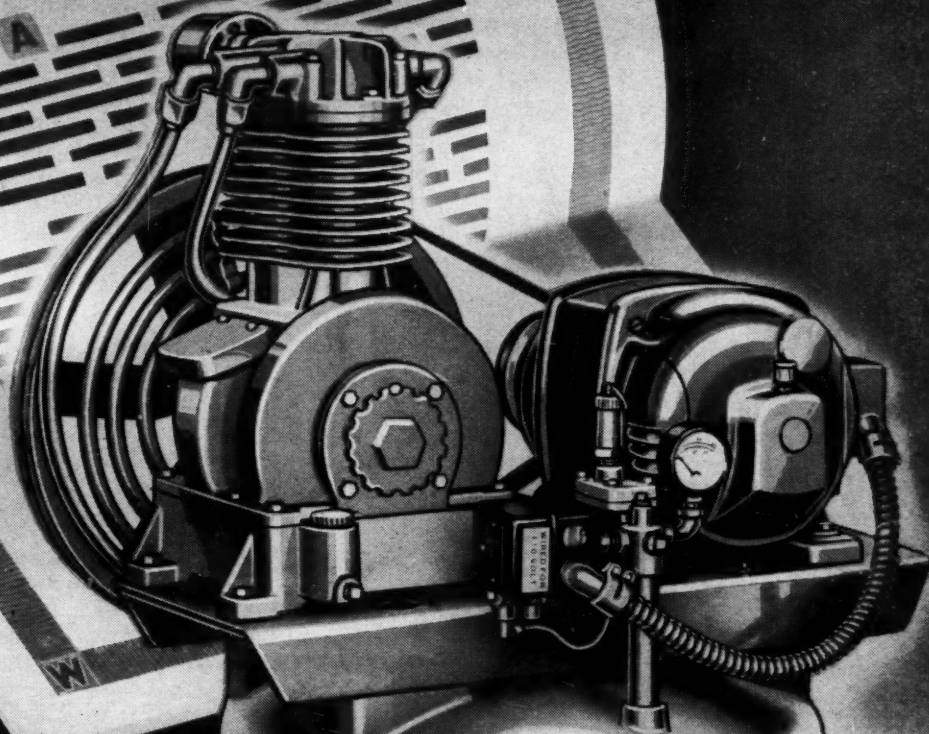
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MOTOR AGE

With Which is Combined **AUTOMOBILE TRADE JOURNAL**
FOR AUTOMOTIVE SERVICEMEN

Vol. LX, No. 6

May, 1941

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Offices: Philadelphia, Phone Sherwood 1424. New York City, 100 E. 42nd St., Phone Murray Hill 5-8600; Chicago, Room 916, London Guarantee & Accident Bldg., Phone Franklin 4243; Detroit, 1015 Stephenson Bldg., Phone Madison 2090; Cleveland, 609 Guardian Bldg., Phone Cherry 4188; Washington, D. C., 1061 National Press Bldg., Phone District 6877; San Francisco, 444 Market Street, Room 305, Phone Garfield 1721; Los Angeles, 6000 Miramonte Blvd., Phone Lafayette 5555; Member of Audit Bureau of Circulations. Member of Associated Business Papers, Inc. Subscription Price: United States and Possessions, Latin-American Countries, \$2.00 per year; Canada and foreign, \$3.00 per year. Single copies, 25c.

**Owned and Published by
CHILTON COMPANY**
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Executive Offices

Chestnut and 56th Streets, Philadelphia, Pa., U. S. A.

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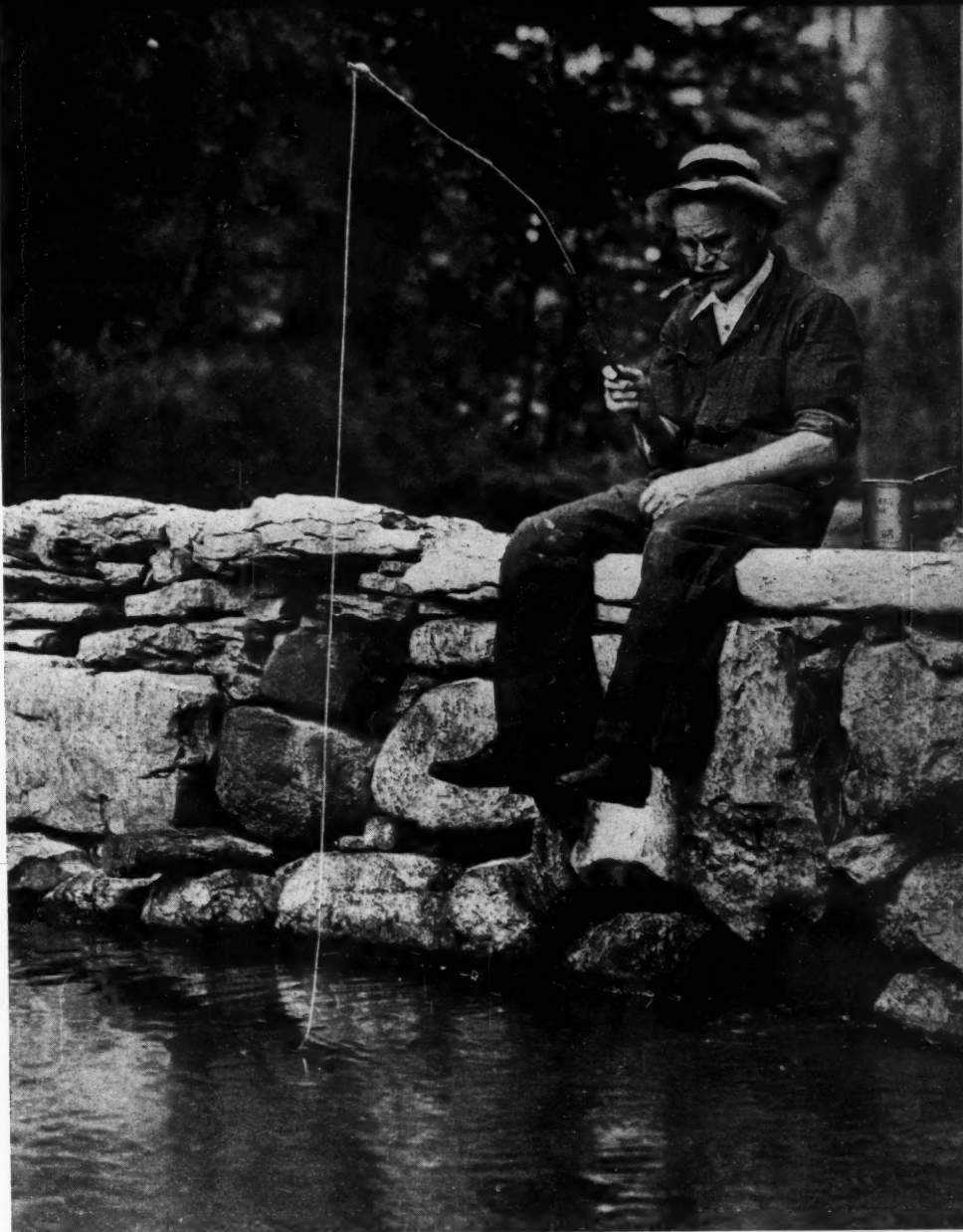
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MOTOR AGE

MAY 1941



The Right Bait

A bent pin, some thread and a willow branch may be all you need to catch suckers, but when it comes to catching real game fish, you need a good rod, a reel, the proper bait and good tested line. The same thought applies to the automotive service business; old inadequate equipment won't do. The boys who are making profits go in for the chrome plate and enamel.

Ego

Why not leave your picture out of at least one issue, complains Charlie Mader, from Mobile, Ala., and substitute something really worth-while, like the rules and regulations of the Indianapolis race. Well, Charlie, that's a mighty sensible suggestion, and only two things prevent me from following it. First of all, my vanity and conceit which no one can equal and, secondly, the rules and regulations would take up more space than the picture. So, instead I've written to Ted Allen, Sect. of the AAA Con-

SHOP TALK

By *Bill Tobold*

test Board, asking him to send you a copy direct.

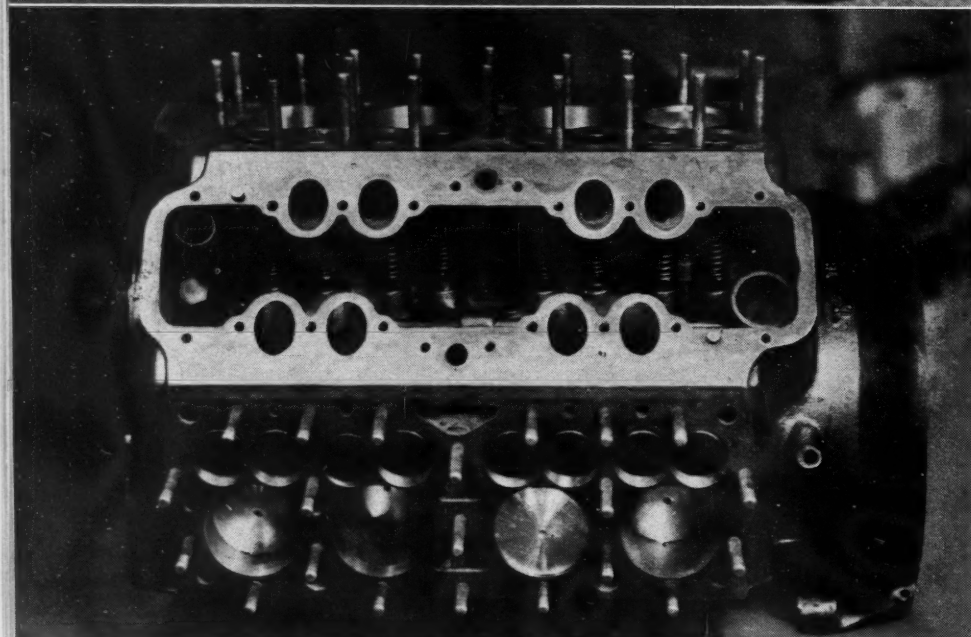
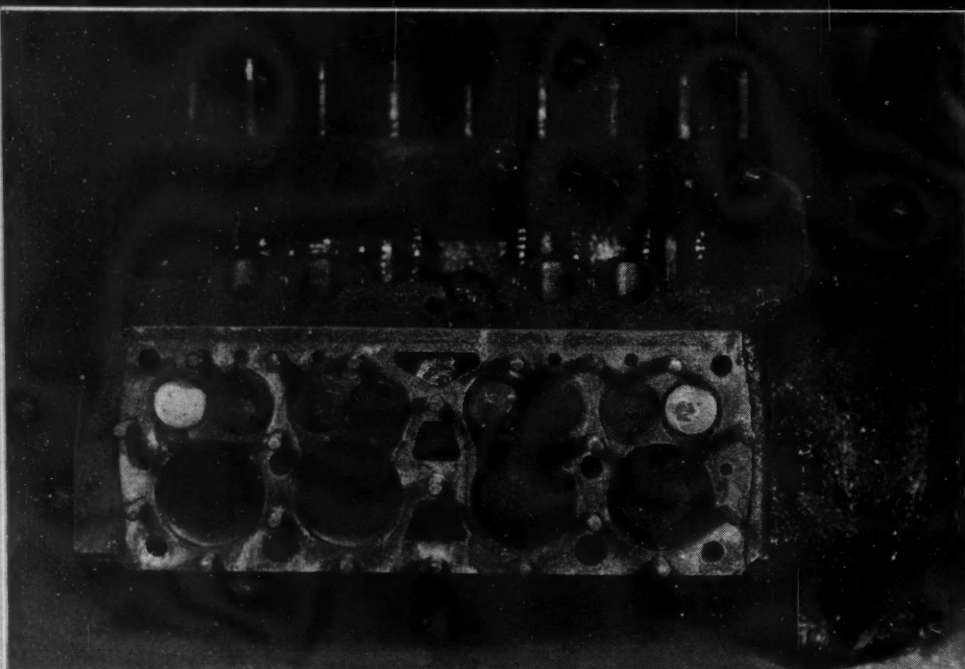
More Ego

After receiving that blow to my pride, I turn with pleasure to a letter from Gene Shermeister, of Sheboygan, Wis., who reinflates my ego to its usual swollen condition by telling me that I guessed right when doing some long-distance trouble shooting on a Nash.

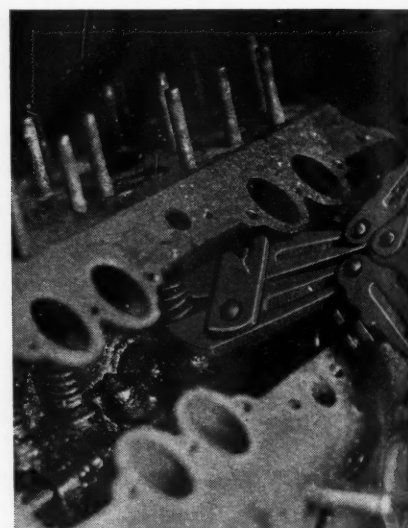
Help

To make it easier for youse guys to get information of various types, I have changed the heavy yellow cardboard insert that appears among the advertising pages in the back of the book. So, if you want any special information on equipment, parts, advertising helps, etc., check the post card and send it in. It's there to help you and I'll see that you get all the help you need.

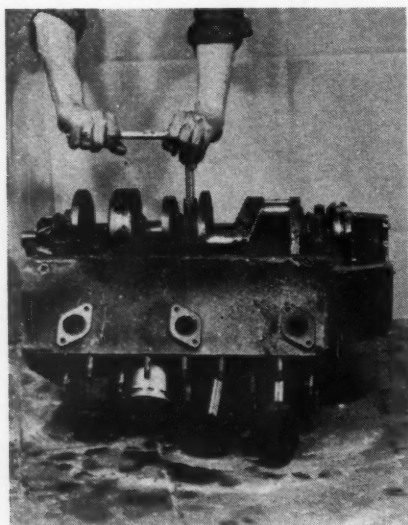
ENGINE



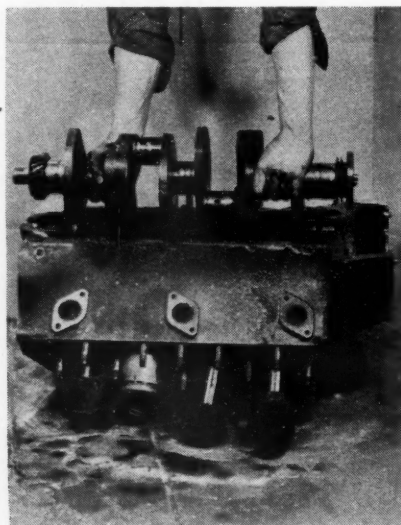
Above is a photograph of the engine as it is received for reconditioning. Note heavy grease and carbon deposits. Below it is shown the reconditioned engine ready to go back to the customer. Fitted with new parts, and cleaned, it is as good as when new.



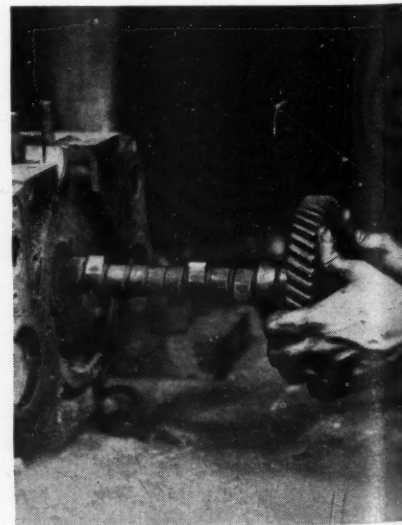
1 First step in disassembling is to cut valve stems with bolt cutters. Time saved is worth more than new valves, it is said.



5 Remove main bearing caps. Same caps are used in rebuilt job unless they have been filed. Check before using.



6 Lift out the crankshaft. A new shaft will be used, and the old one returned to the manufacturer to be reground.



7 Rotate the camshaft to push the lifters out of the way, and pull the camshaft out. Use care not to damage cams.

RECONDITIONING

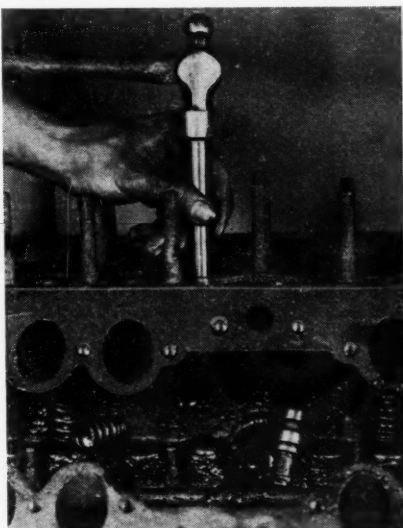
By **BOB HANKINSON**

Here is a helpful story in pictures of the complete job of reconditioning the Ford V-8 engine as it is done in an up-to-date shop. All vital parts are replaced, and the job is good as new

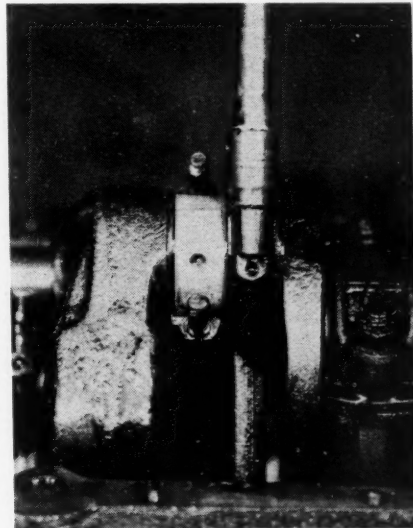
Staff photographs through cooperation of Quaker City Motor Parts Co., Philadelphia, Pa.



2 Pry valve springs out and throw them away. New valves, springs and guides are used when rebuilding the engine.



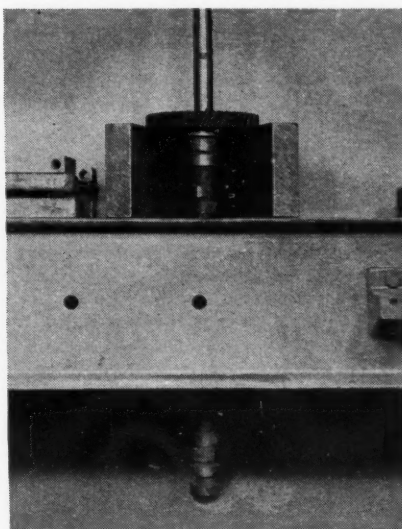
3 Drive the valve stem guides down through the block, being careful not to damage the valve seat or crack the block.



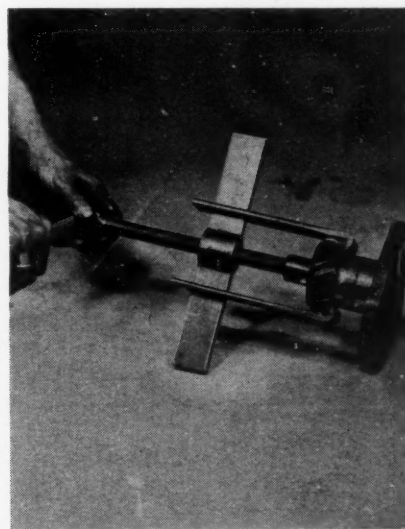
4 Remove connecting rod bearing caps and bearing inserts. Reinstall caps on rods before pushing pistons out of block.



8 Push the lifters out of the block. They are used in the rebuilt engine after they have been cleaned and examined.

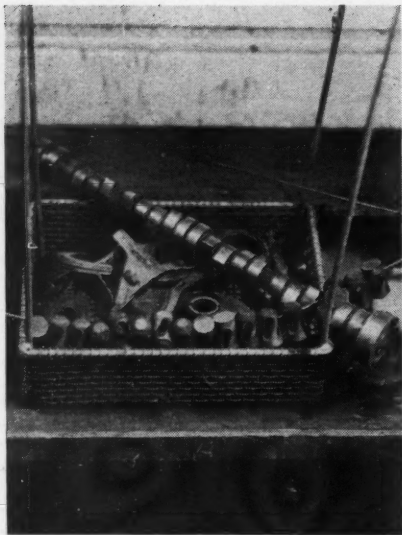


9 Remove old and press on a new fibre timing gear or use a gear and cam-shaft assembly.

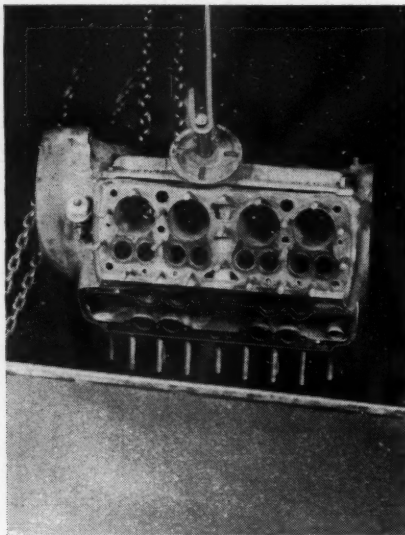


10 Pull the steel timing gear from the crankshaft. This gear is used in the rebuilt engine.

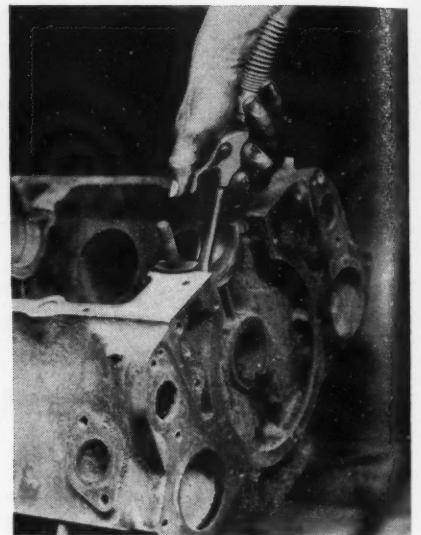
(CONTINUED ON NEXT PAGE)



11 All parts to be used in the rebuilt engine are given a degreasing bath and a final inspection.



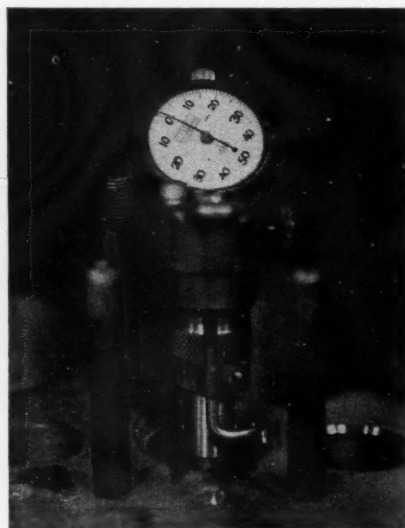
12 The complete engine block with all parts removed is given a degreasing bath to remove all grease and carbon.



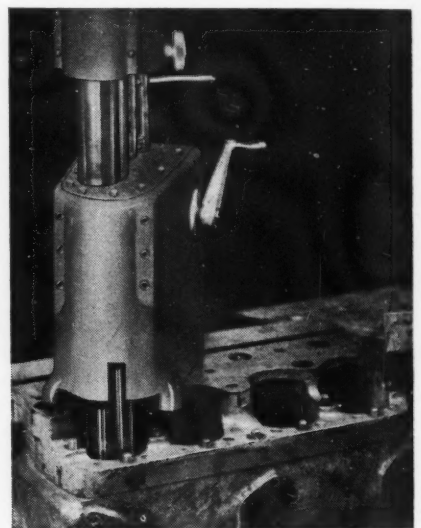
13 Blow out the oil passages in the block with compressed air, and examine for cracks.



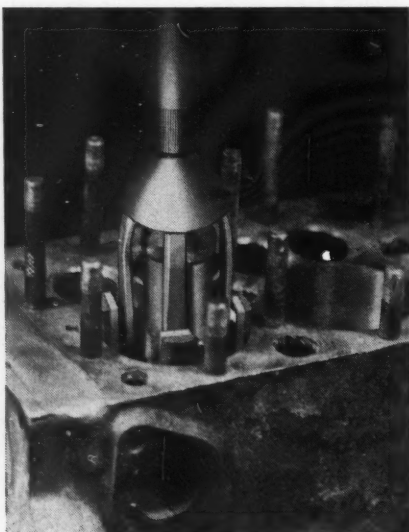
14 Recondition all valve seats, using modern equipment. Good equipment in good condition means good work.



15 Test all valve seats with a dial gage for accuracy. Seats must be true within .002 in. for proper valve fit.



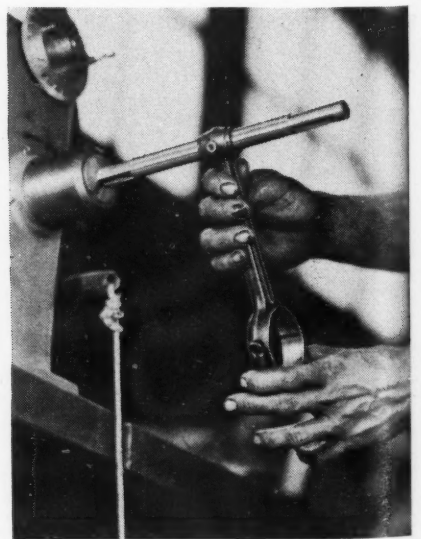
16 If cylinders are rebores, only enough metal should be removed to true cylinders to smallest oversize.



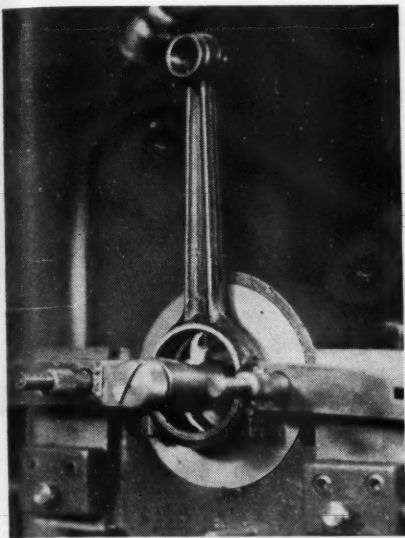
17 Mirror-like surface gives long life. Fine grit stones are used for finish honing.



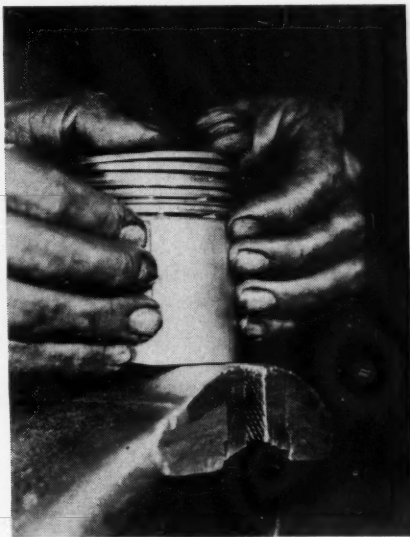
18 Fit new pistons to .0015 in. clearance on thrust side. Use long feeler ribbon for convenience and accuracy.



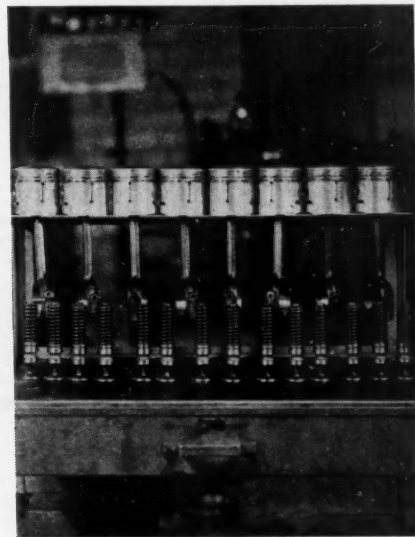
19 Install new piston pin bushing and hone to give a light push fit to the piston pin. Pistons supplied with pins.



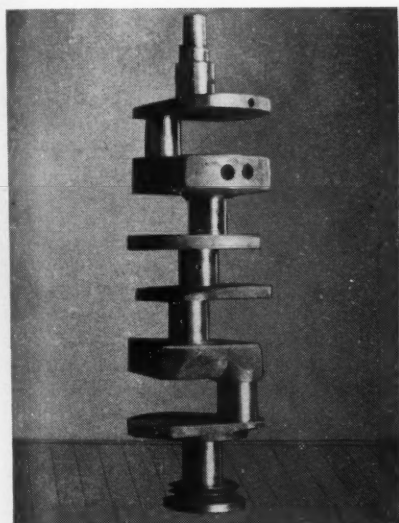
20 Bolt the cap tightly to the rod and true up the bearing end. This is as important as a true crankshaft.



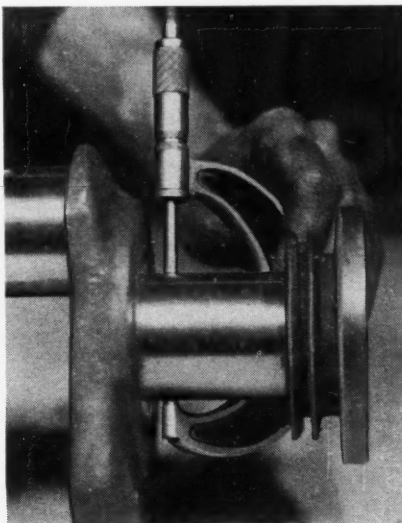
21 Fit new rings to new pistons, being careful to check groove clearance as well as gap clearance.



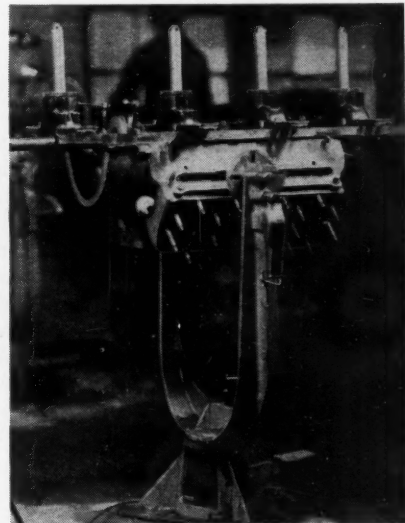
22 New assemblies ready for installation. Connecting rod is only part salvaged from the original engine.



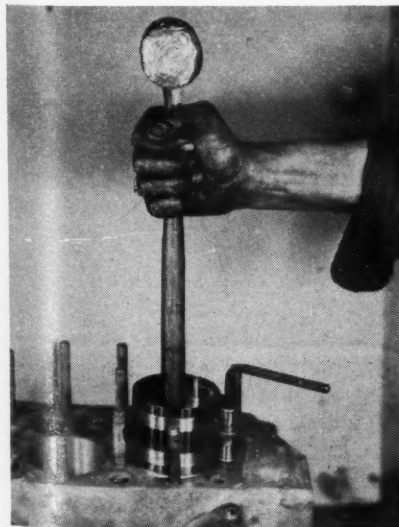
23 A reconditioned crankshaft is used, fitted with undersized bearings. Some shops do their own regrinding.



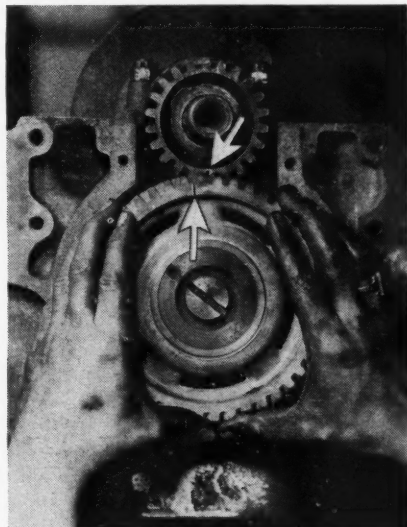
24 Check all bearing journals with a micrometer to be sure they are true, and to determine size bearings to use.



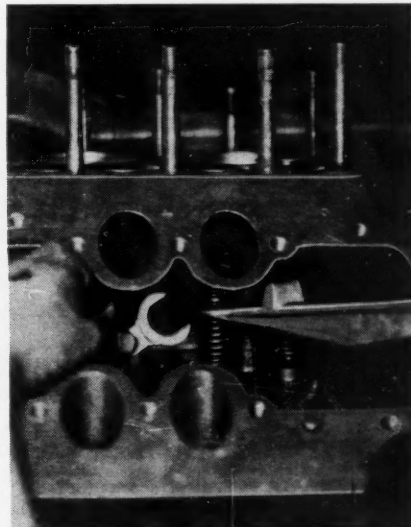
25 Install new main bearings in the block and line ream to size. Precision type bearing does not require this.



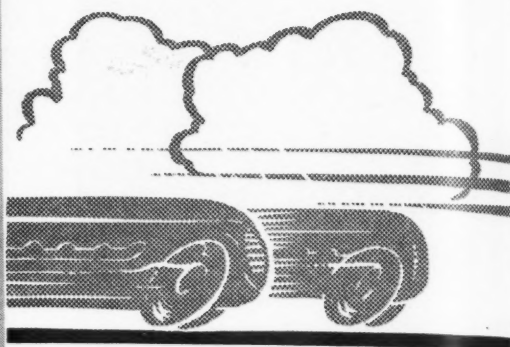
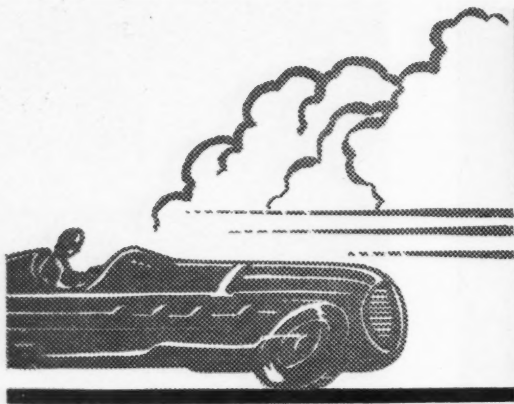
26 When installing pistons in the block, tap them lightly through the ring compressor with a hammer handle.



27 Fitted with a new timing gear, install the camshaft so that the timing marks are together and in line.



28 Install lifters and valve assemblies; pull the guide down with the ring compressing tool and install new locks.



PETER DE PAOLO

A former winner weighs

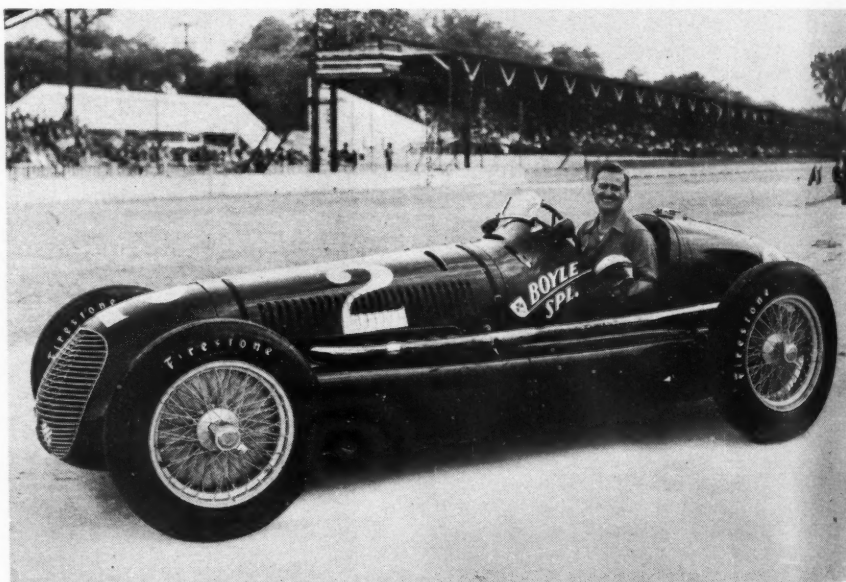
AT this writing, while the national defense program is in full swing, many of the racing boys are again contributing their share of skilled labor, which is so important at this time. Many of them, including the leading drivers and mechanics, are employed in various airplane factories as mechanics and instructors, largely because they understand precision workmanship.

Punching the time clock daily at their various posts of duty, these men are not only helping Uncle Sam prepare his defenses but are getting into shape physically for the coming Indianapolis 500-mile race, May 30. The sort of work they do keeps them on their feet through long, hard hours, and has a tendency to harden them. At Indianapolis, it is just as important to be in good physical trim, as it is to have a good automobile.

For this reason, we salute the members of the racing fraternity for their fine cooperation in the defense program, feeling their connection with automobile racing is a definite advantage to the defense program.

The racing specifications for this year's Indianapolis race are practically the same as last year, thus requiring little if any changes in the cars which participated in last year's event, and enabling the boys to devote most of their time to their duties in airplane factories.

After visiting with some of the fellows working at the Allison En-



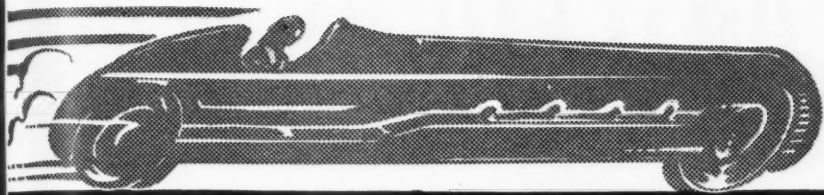
Wilbur Shaw, triple winner at Indianapolis, in the 8-cylinder Maserati in which he won the 1939 and 1940 races. Fans expect the duel between Shaw and Rex Mays, who finished second last year, to be one of the highlights of the Memorial Day contest.

gineering plant in Indianapolis, and others out on the Pacific Coast, the writer was told they would report at the Indianapolis Speedway not later than two or three weeks prior to race time, permitting them to get into the swing of high speed once again.

Thousands of racing fans and critics are eagerly awaiting the

start of this year's Indianapolis race with just one thought in minds—the desire to see the unfinished duel between Wilbur Shaw, three-time winner of this classic, and the ever popular "Glendale Flash," Rex Mays.

In last year's race, these two intrepid drivers were in there striving with every bit of nerve and



PREVIEWS INDIANAPOLIS

the chances of drivers and cars in the year's outstanding speed event



Rex Mays and the straight eight which he will again try to push across the finish line ahead of the field. He set an unofficial track record of 132.7 m.p.h. with the car in last year's trials, and held second place when rain slowed the race after 375 miles.

However, in spite of the expected thrill of this particular duel, we shouldn't overlook the fact that other winning combinations of cars and drivers will also be on hand May 30 to make the going a bit tougher for the favorites. For example, there is the three-car team which Lou Moore, one-time driver, has ready for trial spins.

Lou has two 4-cylinder Miller-Offenhauser cars, with 270 cu. in. displacement, non-supercharged, along with his 8-cylinder Maserati car of 183 cu. in., supercharged, which will be driven by Mauri Rose, Lou's star driver. The 4-cylinder cars will be driven by Duke Nalon, of dirt track and midget car fame, and Cliff Bergere, the Hollywood stunt driver.

We can also expect something exciting from the two Miller four-wheel-drive, rear-engine mounted cars that will be entered by Eddie Offutt from Pittsburgh, Pa. After visiting these racing headquarters, the most elaborate, best-equipped I have ever seen, I can report nothing but the best of this two-car team. It was a pleasure to visit with some of the old-timers who are still in there fighting, the so-called "iron men," such as Eddie Offutt, general supervisor, Jimmy Drake, Jr., sort of commander in charge, Shorty Barnes, veteran mechanic for most of the winning

(Continued on Page 70)

skill for eventual victory. They held first and second positions until the weather ended their beautiful exhibition of driving. Occasional drizzles of rain forced track officials to wave the yellow flag. After that, rules required them to follow along in their respective positions at a moderate rate of speed.

Wilbur Shaw chanced to be in

the lead at the time the yellow flag was waved at the 375-mile mark. Rex Mays was in second position, scarcely half a lap behind, and they finished in that order as the yellow flag still ruled the race when they reached the 500-mile mark. Fans had nothing to do but wait until this year to see the Shaw-Mays feud settled.

TROUBLE SHOOTING ON

HYDRAULIC BRAKES

1. All brakes drag

Caused by:

Incorrect adjustment of shoes.
Mineral or other improper fluid in system.
Defective rubber piston cups and valves.
Pedal does not return to full off position.
Compensating port in master cylinder clogged.

2. One wheel drags

Caused by:

Weak or broken brake shoe return springs.
Incorrect shoe adjustment.
Defective wheel cylinder piston cups.
Loose or defective wheel bearings.
Stuck wheel-cylinder piston.

3. Brake pedal goes to floor board

Caused by:

Excessive clearance between brake shoes and drums.
Worn brake lining.
Air in hydraulic system.
Leak in hydraulic system.

4. Excessive pedal pressure

Caused by:

Warped brake shoes.
Grease-soaked lining.
Incorrect shoe adjustment.
Egg-shaped drums.

5. Car pulls to one side

Caused by:

Different kinds of lining on opposite wheels.
Grease-soaked lining.
Incorrect adjustment of anchor pin.
Primary and secondary shoes reversed on one wheel.
Loose wheels.
Unequally inflated tires.
Tires worn unequally.
Scored brake drums.
Brake dust or other foreign material



This handy list of usual and unusual faults will save time on tough jobs

between drum and lining.
Weak chassis springs.
Defective or weak shock absorbers.
Rough brake drums.

6. Excessive pedal action

Caused by:

Incorrect brake shoe adjustment.
Scored brake drums.
Incorrect lining.
Loose brake backing plate.

7. Spongy brake pedal

Caused by:

Air in system.
Incorrect brake shoe adjustment.

8. Squeaking brakes

Caused by:

Warped brake shoes.
Loose lining.
Dirt imbedded in lining.



View of the modern Tacconelli service shop at Ardmore, Pa., where first-line batteries are sold in quantity. Right, a battery man uses a cut-away section of a first-line unit to convince a customer that quality pays in buying a battery by calling attention to the better construction of the costlier unit.

HANKERING of the average customer after bargain prices is no obstacle to selling first-line batteries when a shop that carries the higher-priced product emphasizes the superior service it can render. The point is proved conclusively by the Joseph P. Tacconelli Co., a shop offering complete automobile service at Ardmore, Pa. This shop sells 750 to 1000 standard batteries a year at premium prices.

Located only a few miles from Philadelphia, the Tacconelli shop is in competition, so far as its battery sales and service are concerned, with several chains and individual vendors of low priced batteries. It has built up its remarkable volume largely by emphasizing service.

"We'll tell a customer," says Joseph P. Tacconelli, the proprietor, "that the cheaper battery *looks* like a good buy. We'll admit that the low priced unit is guaranteed and that most chains will make a fair adjustment when it fails.

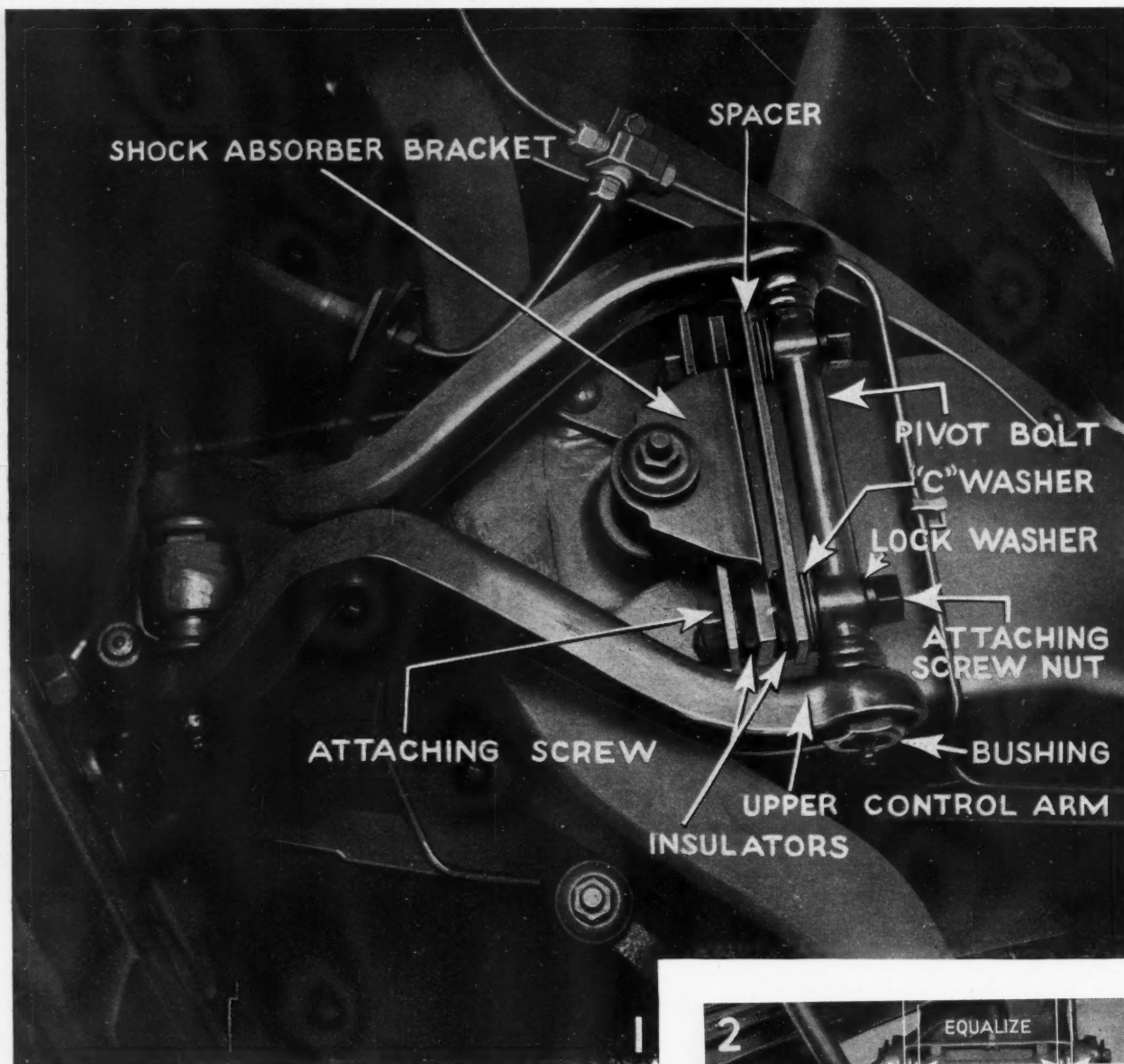
"But we also point out that the customer must take his battery to the store before he can get an adjustment. First he has to call on a service shop to bring him a rental if his battery goes dead. Most battery failures occur when the owner is in a hurry to get to work in the morning or when he is starting out after dinner for an evening's entertainment. In the morning, the store that sold him the battery isn't open yet, and in the evening it's already closed. Getting an adjustment takes time and trouble.

"On the other hand, if a car
(Continued on Page 76)



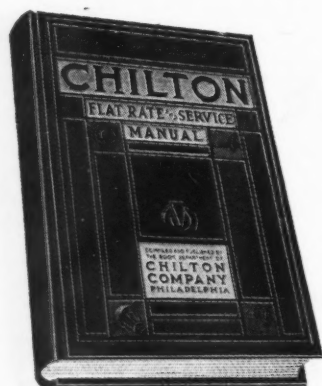
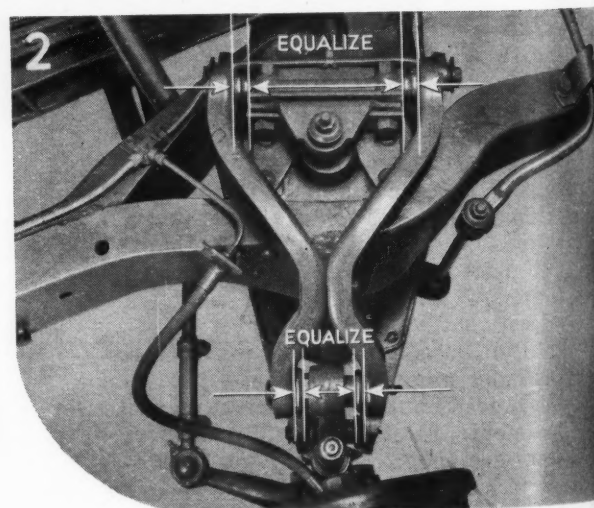
GUARANTEEING BATTERY PERFORMANCE

**This shop keeps sales volume
at peak by emphasizing quality**



Front suspension as used on the 1941 Nash Ambassador 6 and 8. Note the shock-absorber mounting bracket for the airplane-type shock absorber, mounted inside the coil spring; also shims for adjusting caster and camber.

Right. When installing the steering knuckle support arm in the upper and lower control arms, the threaded bushings must be equalized between the ends of the yokes. Pivot bolt at inner end of control arm must also be centered.



FLAT RATE WHEEL

Instructions for doing Chilton Flat Rate Operation A-8y

THE front-wheel suspension system of the 1941 Nash Ambassador 6 and the Ambassador 8 is the conventional parallel-link type, but its design is slightly different from others insofar as adjustments for caster and camber are concerned.

The direct-acting type of shock absorber is mounted inside the coil spring, the lower end being attached to the plate in the lower control arm, and the upper end being attached to a plate on the upper side of the frame front cross member. This type of mounting relieves the upper control arm of carrying the shock absorber, as in the case of the type of suspension used by General Motors make cars, and permits the upper control arm to act strictly as a support for the front wheel.

The inner end of the upper control arm is mounted to the shock-absorber bracket. The outer end carries a threaded bolt between the two ends of the yoke, and there is a threaded bushing which rides on this bolt. The bushing is threaded on the outside also, and screws into the upper end of the steering-knuckle support arm, controlling the fore-and-aft position of the support arm.

When the steering-knuckle sup-

port arm is assembled to the upper and lower control arms, the clearances between the yoke ends and the threaded bushings must be equalized at 3/16 in. as shown in Fig. 2. Be sure the rubber seals are installed over the threaded bolts before they are installed, so as to keep dirt and water from entering between the threaded bushings and the bolts.

The desired caster angle for these two models is 0 deg., with a permissible range of 1/2 deg. negative. If it becomes necessary to adjust the caster angle, the job is done by installing "C" washers over the pivot bolts which hold the inner end of the upper control arm to the shock-absorber bracket, as shown in Fig. 3. These "C" washers are available in two thicknesses, 1/32 in. and 1/16 in. The 1/32 in. thick washer affects the caster angle 1/6 of a deg. and the 1/16 in. thick washer affects the angle 1/3 of a deg.

To change the angle, loosen the two pivot bolts holding the control arm to the shock-absorber bracket, tap the bolts back to provide clearance between the mounting bar and the spacer bar, and install the necessary washers over the bolts to throw the outer end of the arm in the desired direction—forward to

decrease the caster angle, and backward to increase the angle. Do not change the position of the steering knuckle support arm on the threaded bushing. The equalized clearances mentioned in relation to Fig. 2 must be maintained.

The camber angle desired is 1/4 to 3/4 deg. It is adjusted by loosening the pivot bolts holding the upper control arm to the shock-absorber bracket, tapping them back to provide clearance between the bar and the spacer bar, and removing or installing an equal number of "C" washers on each pivot bolt to obtain the desired setting. See Fig. 1.

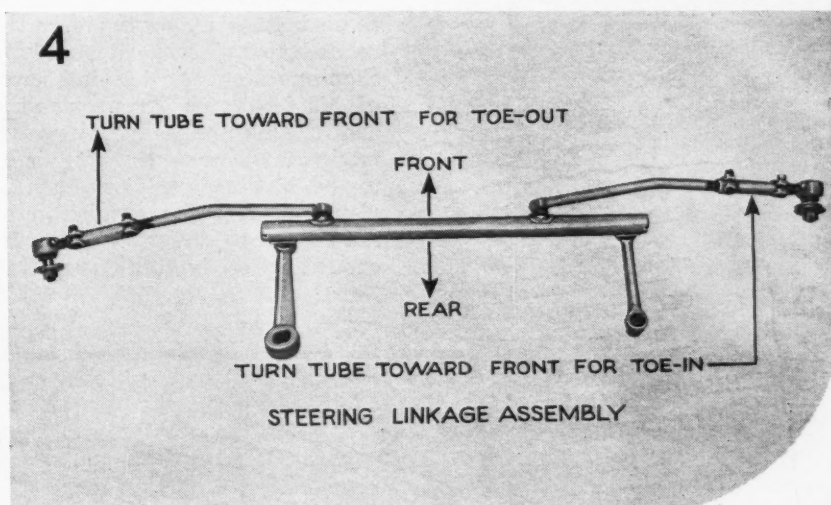
When checking toe-in, the first point is to set the front wheels in a straight-ahead position. This can be done by locating the steering gear on the high point of the worm. This point can be determined by removing the steering wheel and checking the position of the wide serration on the lower side of the steering tube. This spot must line up with the line on the under side of the steering wheel hub when the spokes of the steering wheel are straight across in a horizontal position.

With the wheels straight ahead, loosen the clamp screws at each end
(Continued on page 78)

Caster adjustment is obtained by installing one or more "C" washers over the attaching screw as shown in Fig. 3, shifting the upper

control arm forward or backward as required to obtain the proper angle. Camber setting is obtained by installing or removing an

equal number of "C" washers over each attaching screw. Fig. 4 shows the tie rod adjusting tubes for adjusting front-wheel toe-in.



ALIGNMENT FOR THE 1941 NASH

as applied to Ambassador 6 and 8, Models 4160 and 4180

MECHANICS

shortage of skilled men?

fill. The trouble isn't finding the men—we've got plenty of them registered—but in convincing the man he ought to take the job. He considers the pay too low or working conditions unsuitable. These days he can afford to pick and choose and he's doing it."

For the average shop, however, there is no reason to get bothered about an immediate labor shortage. One reason is that aviation is not taking nearly so many automobile mechanics as alarmists feared. Automobile men need specialized training for the work, and the aviation industry is training men of its own from the ground up. The same is true to a lesser degree of other defense work. The result is that the great bulk of automobile mechanics are still working on automobiles.

This condition, however, cannot be expected to last. The plane factories, powder and ordnance mills, shipyards, and other plants still building to supply defense goods

(Continued on page 60)



Some service shops that have hired recent graduates of vocational schools and mechanics trained in special courses set up under the national defense program have found the trainees lacking in both knowledge and skill.

Most instructors would rather turn out a well-trained student than a poor one, and would come closer to doing it if they knew precisely what skills a trainee is expected to possess.

As a shop operator, what would you expect of a youth just out of vocational school? What jobs would you expect him to handle alone, if any? How would you improve his training?

Training mechanics becomes more important every day the present emergency lasts. The more the schools know about the job they are undertaking, the better they will be able to train men. So write and tell us how you would improve training courses.

THE 1941 Buick, equipped with a Stromberg carburetor, has a vacuum starting switch mounted to the carburetor throttle body and operated by the position of the throttle shaft and by the vacuum of the engine.

The electrical circuit is opened and closed by means of a contact rotor on the throttle shaft and two contact springs, one of which is combined with the lock-out lever. The vacuum diaphragm is located in the top of the unit and is held in place by a die-cast cover which is screwed to the switch housing and forms the vacuum chamber and also controls the position of the diaphragm return spring.

Should it become necessary, during repair operations, to remove this switch, be sure the electrical connections are properly made when the switch is reinstalled. The wire having red crossing tracers should be connected to the terminal on the front of the switch. This is the "hot" wire, and should be connected to this terminal to protect the lock-out lever from the short circuit if it is accidentally bent back against the housing during the timing operation.

Fig. 1 shows the position of the working parts of the switch with the throttle closed and the engine not running. The insulated part of the rotor is against the rubbing block of the contact arm, holding it away from the contact part of the rotor. The diaphragm return spring is holding the diaphragm down in the vacuum chamber.

As the accelerator pedal is depressed to crank the engine, the

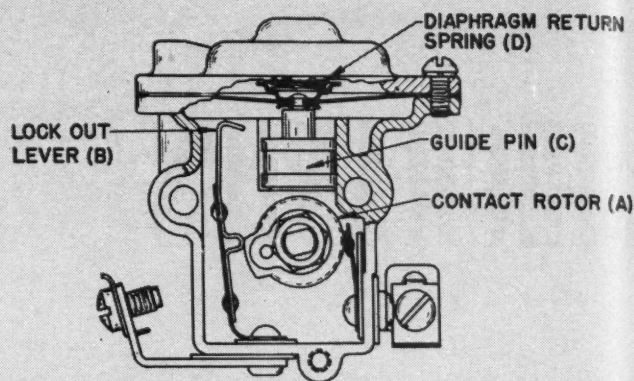


Fig. 1
UNLATCHED POSITION WITH
CLOSED THROTTLE (ENGINE NOT RUNNING)

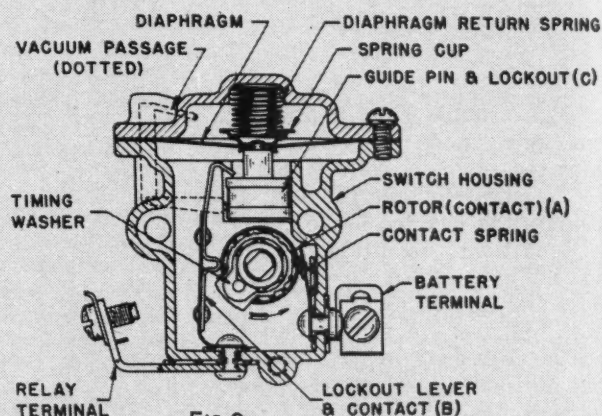


Fig. 2
CRANKING POSITION
WITH OPEN THROTTLE

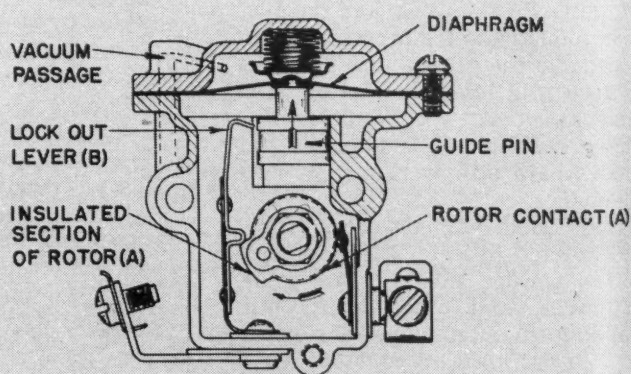


Fig. 3
ENGINE RUNNING
THROTTLE CLOSED

SERVICING THE VACUUM STARTING

A description of the operation and timing adjustments of the Delco-Remy vacuum



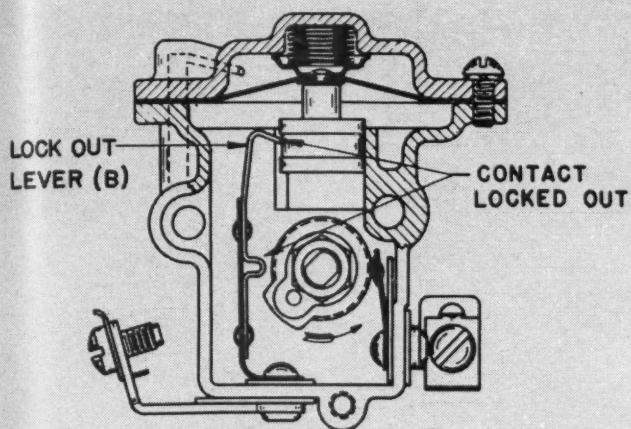


FIG. 4

**RUNNING POSITION
PART THROTTLE**

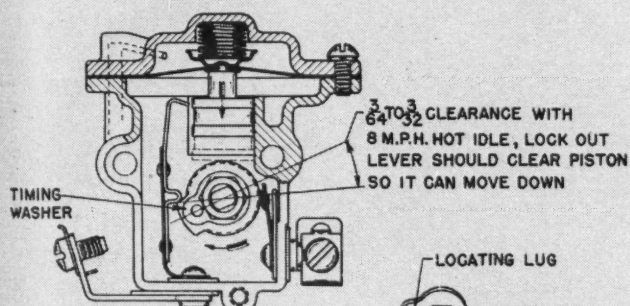


FIG. 5

UNLATCHING POSITION

LOCATING LUG
TIMING WASHER
IDENTIFICATION NUMBER
STAMPED ON OPPOSITE
SIDE

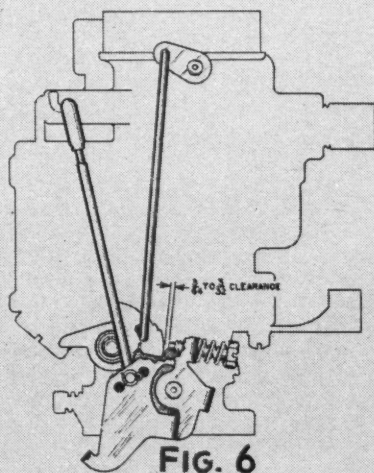


FIG. 6

throttle shaft is rotated so that the insulated high side of the rotor is moved out from under the hump on the contact arm, allowing it to drop down on the brass contact surface of the rotor, completing the contact between the battery terminal to the relay terminal, as shown in Fig. 2. In the same operation, the hook on the end of the contact arm (or the lock-out lever) falls above the guide pin, preventing it from being drawn upward by the starting vacuum.

As soon as the engine fires and the throttle shaft is allowed to close, the insulated high side of the rotor moves back under the hump on the contact arm or lock-out lever, breaking the starting circuit and allowing the guide pin to be drawn upward by the vacuum diaphragm. (If the operator does not permit the throttle shaft to close, the contact is automatically broken in the switch as soon as the generator starts to charge.) See Fig. 3.

With the engine running at part throttle, the working parts of the switch take the positions shown in Fig. 4. The hook on the lock-out lever is resting against the guide pin which is held up by the engine vacuum. With the guide pin in this position, it is impossible for the hump on the lock-out lever to make contact with the contact surface of the rotor on the throttle shaft.

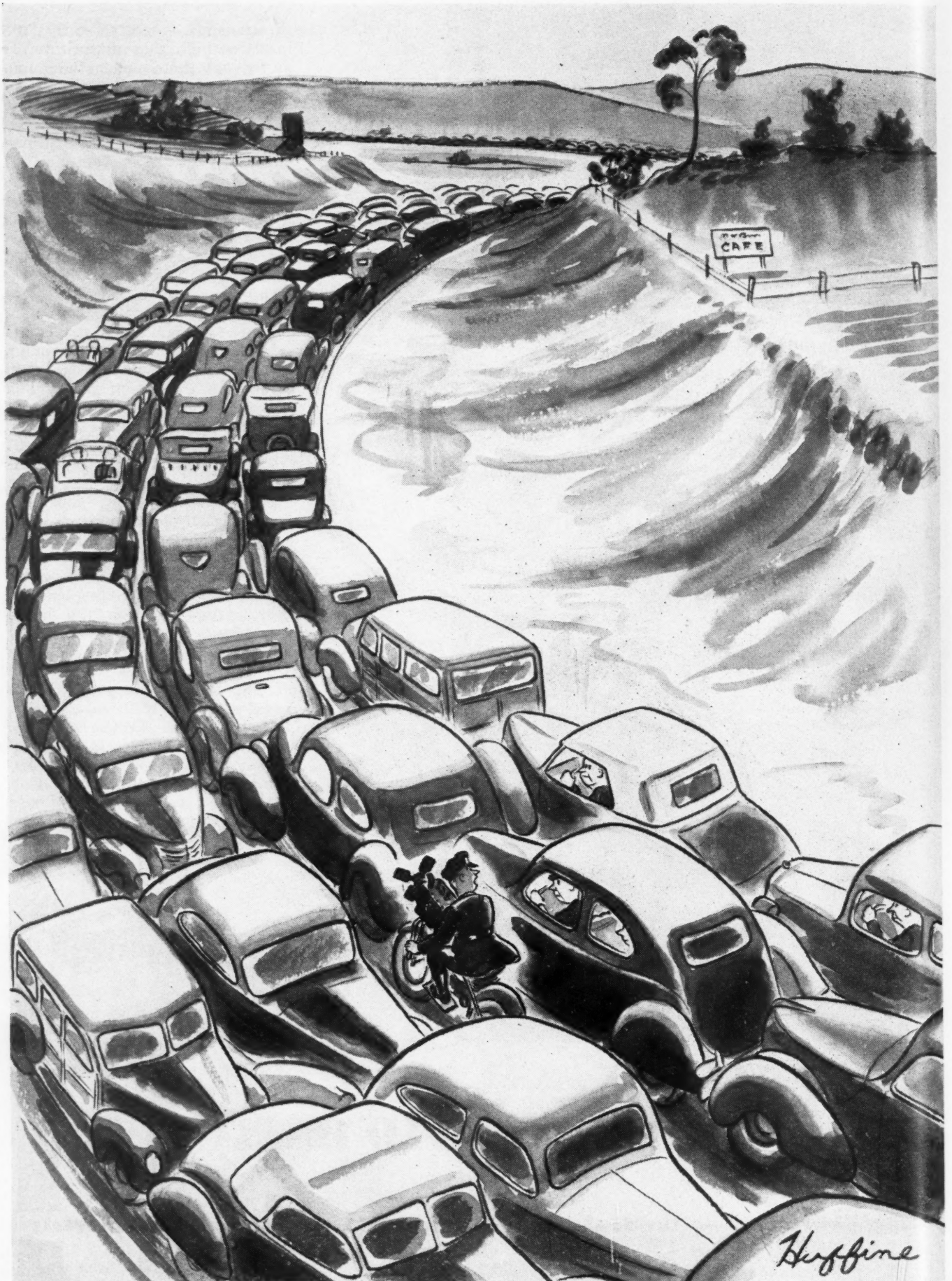
Timing this switch is very important, as improper operation may result in failure to start during cold weather, or clashing of starter gears during acceleration at low speed.

(Continued on page 78)

SWITCH ON THE 1941 BUICK

starting switch used on the 1941 Buick cars equipped with Stromberg carburetors





"Any of you folks here drop a motor?"



TUNING

IGNITION DISTRIBUTORS

**Simple hints on procedure
to make it easier to do a
faster, more accurate job**

WHILE worn, burned and pitted breaker points are the most usual cause of distributor failure, there are many other parts of the distributor which must be checked if satisfactory service is to be given and trouble eliminated.

First of all, too many mechanics waste time trying to true up a set of worn points. Even if a perfect job of stoning is done, so that the surfaces of the points are perfectly flush, the points may not be serviceable because the rubbing block is worn. The combined effect of the thinner points and the worn rubbing block is to make it impossible to obtain the correct cam angle. In other words, the points will not be closed long enough, thereby preventing the coil from building up and delivering a good spark.

New breaker points should, therefore, be installed whenever possible. When installed the points must meet squarely (not on an angle), and be in perfect alinement. Never bend the movable arm to aline the points. The stationary point should be bent by means of special bending tools and the alinement of the points should then be viewed through a magnifying glass to check for slight errors in alinement.

If the breaker point gap is to be set by means of a feeler gage, a gage of the wire type rather than the flat shim stock type should be used. (No. 22 B & S gage is .0253 in., No. 24 is .020 in., No. 26 is .0159 in.) However, to get the hottest spark at the plugs, breaker gaps should be set on a distributor testing set. The reason for this is that, even though the gap is set to the correct specification with a feeler gage, it does not necessarily mean that the cam angle or dwell is correct. As the cam angle determines the length of time that current is passing through the primary winding of the ignition coil, it can readily be seen that any change in that time will affect the energy of the spark. Worn points, rubbing block, or distributor shaft will change the cam angle or dwell.

Setting the breaker points on a special testing fixture also permits checking the distributor cams. A cam which is worn or a new cam which is inaccurately ground will result in uneven timing of the spark for each cylinder. An inaccurate cam will cause some cylinders to fire too early and others too late, with the resulting ping-pong, overheating and loss of power.

(Continued on Page 77)



GLASS REPLACEMENT

a part of

BODY SERVICE

1. The first step in removing the windshield glass is to cover the top of the instrument panel with masking tape to guard against damage to the panel.

2. Remove garnish molding screws and remove molding. Remove screws holding the center molding strip in place. These screws also hold the vertical strip on the front of the windshield.

3. Lift off the clips at the top and bottom of the windshield in the front. These clips cover the ends of the metal moldings which cover the rubber molding. Pull the ends of the metal molding away from the rubber molding, working it loose all the way around and remove molding.

4. Loosen the rubber molding all the way around on the inside and outside of the glass, and where the molding fits over the body fence or ledge. Use a piece of wood tapered like a wedge to work the molding loose, to avoid scratching the paint. With the wooden wedge, pry the rubber molding off the body ledge, starting at the upper outside corner and working alternately across the top and down the outer edge.

5. Push the glass in as the rubber is freed from the ledge, rolling the rubber off the ledge across the top and bottom of the opening.

6. Roll the rubber molding off the glass, starting at the upper outside corner, working across the

top and down the outside and across the bottom.

7. Free the glass from the center strip and from the bottom of the rubber molding with the wooden wedge, working the glass away from the center bar. As soon as the glass is free at the top inside corner, it can be pulled away from the opening.

When installing a new glass, coat the edges with a soft soap such as a linseed oil soap. Do not use oil or grease.

8. Insert the glass in the bottom of the rubber molding and slide it to within 4 in. of the center bar.

9. Hook the rubber molding over the glass at the top inside corner. Place the molding in position on the bottom of the glass, and gradually work it on across the top as the glass is pushed toward the center strip.

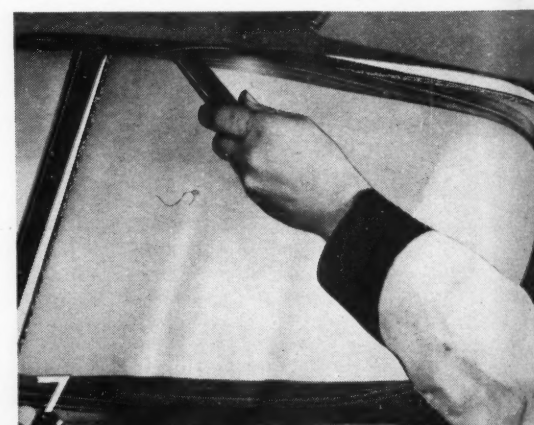
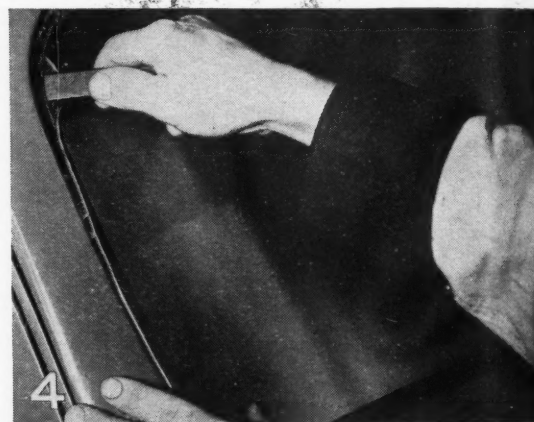
10. Use the wooden wedge, and work the molding over the glass at the upper outside corner, down the outer edge and at the lower corner. Work the glass into the center strip.

11. Hold the glass close to the opening and work the rubber over the body ledge.

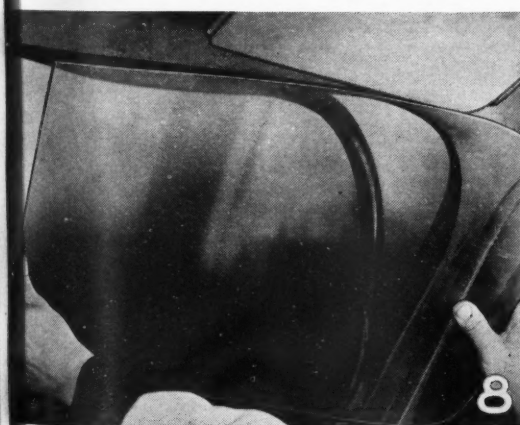
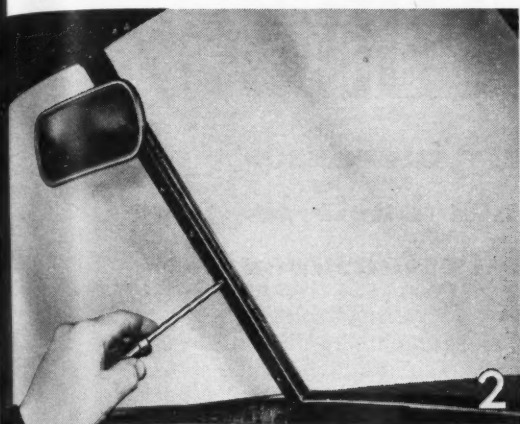
12. Put a coating of sealing compound over the body ledge, between it and the rubber molding, and between the molding and the glass.

Install metal molding and clips, and the vertical center strips.

A step-by-step picture

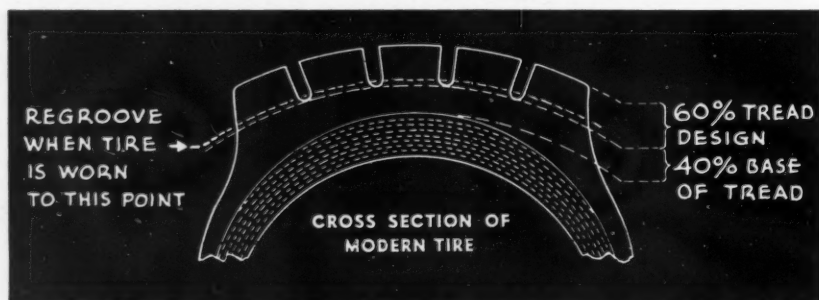


story of replacing windshield glass in a 1941 Plymouth



REGROOVING BALD TIRES

Restoring non-skid tread pattern not only increases the useful life of a worn tire, but brings back its new-tire appearance as well as its safety features



Cross section view of modern tire, showing tread rubber remaining when tread pattern is worn off. This is the plus mileage which regrooving makes available through cutting a safety tread pattern.

Top—Proper positions for holding the tire regroover when cutting the center tread pattern. Hold it by the handles when cutting crosswise, close to the side ribs of the tread.

BALD-HEADED tires are dangerous, not so much from the threat of blow-outs as from the hazard of skidding due to the loss of the non-skid tread pattern. When a tire is worn so smooth that all the tread pattern is gone, there is still 40 per cent of useful tread left on the tire.

In the study of tire wear, it has been determined that a thickness of $1/32$ in. of rubber on the tread portion of the tire will deliver approximately 2000 miles of service in normal use. The average tire in use today has about $1/8$ in. of rubber over the center of the tire after the tread pattern has been entirely worn off. This means that there are approximately 8000 miles of useful service left in the tire if it is provided with a non-skid tread to prevent excessive wear of the remaining rubber due to the effects of skidding.

The answer to providing this protection for the tire is regrooving—cutting a tread pattern into the remaining rubber to prevent skidding. Equipment for doing this job is available at costs ranging from about \$10 upward, and anyone with a little practice can become proficient in the use of these tools. A tire can be regrooved at a cost of about 25 cents, the average charge to the customer being 75 cents.

In some States, safety inspection laws have been passed requiring that all tires have a distinct tread pattern in order for the car to pass inspection. If the price of crude rubber goes up, as it did during the last war, tires also will advance in price. Car owners will be more

(Continued on Page 86)

SPRING time is clean-up time—time to haul out the junk that has accumulated in the corners during the winter, wash the windows, clean up the floor and get the paint brush working on the floor under the lubrication lift, the floor guide lines, the walls, equipment and anywhere else that needs a little face-lifting.

Floor cleaning is not a new problem. It has been with us ever since the first automobile started leaking grease and oil on the floor, and tracking in mud and snow from the street. Much progress has been made, however, in the method of floor cleaning. Today's modern floor-cleaning solutions have done much to remove the fire hazard that is present when gasoline alone is used, and the chemical action is



CLEAN UP WITH CHEMICALS

much more rapid and requires less scrubbing and scraping.

Cleaning compounds are available in varying degrees of strength, depending upon the condition of the floor. If the grease is half an inch thick on the floor, and has been packed down until it is almost as hard as the floor itself, a strong solution will be needed. On the other hand, if the floor isn't very dirty, a weak solution, applied with a brush or mop, may be all that is required.

Most of the cleaning compounds on the market are designed to be used with either hot or cold water. In particularly tough cases, kerosene is added instead of water to provide a stronger solution having greater solvent power. It is applied with a wire-bristle brush so that miniature furrows will be made in the surface of the grease, permitting the solution to soak in and loosen the deposit at its base. After it has soaked in five minutes to half an hour, the solution is flushed off with water.

Customers have confidence in a clean shop. You can keep yours spotless with a floor-cleaning solution

Once the floor is clean, it is no job to keep it that way if it is given attention regularly. Painting the floor under the lubrication hoist provides an incentive to keep it clean, since each spot of grease shows up so plainly. The careful workman will wipe up the floor after each lubrication job, so that an occasional mopping with the cleaning solution is all that is necessary. Then, too, paint seals the pores of the cement and prevents the grease from working into the pores and leaving a stain.

White guide lines, marking off

the boundaries of each working space, also promote neatness and cleanliness in the shop. To make the mechanic even more conscious of doing his part toward keeping the place clean, carry the painting idea one step farther and paint the floor in each working space.

Don't confine floor cleaning to the interior of the shop. Clean up the driveway leading to the shop to make the entrance inviting; paint a 6-in. wide white stripe from the curb to the doorway on each side of the drive, with a white entrance arrow in the center.



An alert service manager uses lifts to boost business in

IN the course of a year, the Scott Smith Cadillac Co. shop in Philadelphia sells more than 24,000 lubrication jobs. That is a year-round average of 80 jobs a day. Since the firm operates only six lifts, two of them at branch shops, and employs only seven men in the department, the lubrication set-up is extremely successful and more than ordinarily profitable. However, in the opinion of A. G. Eckenhoff, the service manager, these facts are not the ones that make the department important. Its great value lies in the opportunity it affords to sell repairs and other services.

Established routine makes the opportunity far greater in the Scott Smith shop than is usually the case, and expert selling takes full advantage

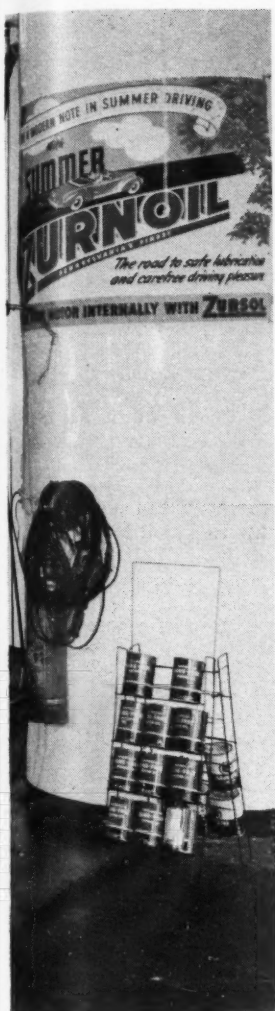
of the opportunity. In analyzing the shop orders, it is not possible to determine which of the cars serviced came in originally for lubrication, but it is easy to separate from the rest those on which lubrication appears as an item. On this class of orders, the average sale to the customer is \$12.28. Of this remarkably high sum, \$6.12 is billed as labor, \$3.52 for parts, and \$2.40 for accessories. The remaining 24 cents are spent by the customer for gasoline.

Expressed in another way, those extra dollars buy brake, steering, and clutch adjustment and repair, for removing body squeaks and rattles, for tune-ups and other engine service, for body and fender work. Compared with the service business derived from other

sources, Eckenhoff believes that the work obtained through contact in the lubrication department is much the greater.

The exceptionally high average sale to lubrication customers is not something that just happens. Selling is carefully planned and just as carefully carried out.

In the first place, a Scott Smith lubrication consists of more than shooting grease into fittings. Every car that is run onto a lift is tested as thoroughly as time and conditions permit. Tires are checked for pressure and condition, headlights and stop and tail lights are tested, a hydrometer reading of the battery is taken, and the clutch pedal is checked. A "thank you" card, slipped over the steering wheel before the car is turned over to the

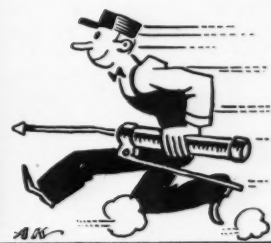


\$12.28

FOR EACH

LUBRICATION

JOB



the rest of the shop • • • A. G. ECKENHOFF

customer, shows the results of these checks, and a considerable amount of service, together with an occasional tire or battery, is sold by this means alone. The shop does not consider its selling job done, however, until the car has been given a road test.

Obtaining permission to road test a car that has come in merely for a lubrication job requires considerable tact. Unlike the owner whose car has developed some definite trouble, the lubrication customer is not even thinking of service in terms of major expense, and, unless carefully handled, might object strenuously to having his car road tested. To overcome his inertia, the customer is encouraged to leave his car for a stated period, thus giving the shop

a chance to check it at leisure. A different approach must be used when a customer insists upon waiting until the lubrication job is completed.

Delivery is not made by one of the lubrication men, but by one of the shop's testers. He calls the customer's attention to the report on the inspections already made, and adds: "If you can spare a minute or two, I'd like to drive you around the block to make sure everything else is O. K." Except in isolated cases, the customer agrees, and the car is taken out for a road test.

The road test develops an astonishing amount of business. With the customer beside him, the tester calls attention to hard steering, to poor braking, to free play in the

clutch pedal, and annoying body rattles. At the end of the drive, the tester asks permission to do the necessary work. Enough customers say, "Yes," to keep the shop humming.

No attempt has been made recently to break down the figures on service volume to show the actual proportion of work that originates with the tests in the lubrication department.

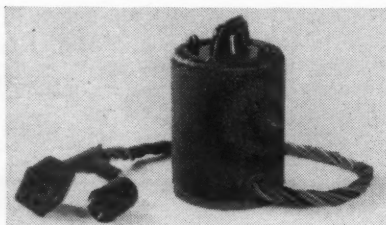
"The figure wouldn't help us much," says Eckenhoff. "We're sure that more than a fair share of work comes from lubrication contacts. As a matter of fact, lubrication is the foundation of our service business, and we know it. We'd have to have lubrication lifts even if they didn't account for the the profit they do."

NEW profit makers

PARTS TOOLS EQUIPMENT ACCESSORIES

Flashing Signal Switch

A new solenoid-motor timer switch, designed for use with flashing warning or direction-indicating signals, has been developed by Philip H. Chase, 1000 Chestnut St., Philadelphia, Pa. It operates on the mechanical vibration and rotation principle instead of thermal, less than 1/10th second required between energizing timer and flash inception. The unit is combined in one housing instead of a separate flasher and control switch, simplifying installation, and can be mounted on the steering column, under the cowl or under the hood.



Carburetor, Fuel Pump Cleaning Compound

A new product for cleaning carburetor and fuel-pump parts as well as automobile parts in general has been introduced to the trade by E. A. Gerlach Co., 3567 Sepviva St., Philadelphia, Pa. This specially compounded solution is known as Soax, and is claimed to be easy on the hands, non-inflammable, easy to use and economical. Parts are immersed in Soax, rinsed in gasoline or kerosene, and dried with an air hose. Leaves parts chemically clean. Available in 1-gal. can, and in 2-gal., 5-gal., 15-gal., 30-gal. and 55-gal. drums.

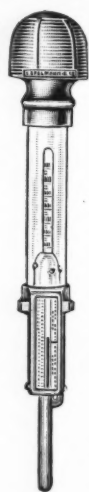
Heavy Duty Jack

A new heavy-duty 50-ton hydraulic jack has been announced by the Bee-Line Co., Box 569, Davenport, Iowa. The jack is rated at 50 tons with a 50 per cent overload guaranteed by the manufacturer. Among its construction features are special high-strength alloy, automatic take-up on



all packing, large oil ports and passages assuring quick return of the ram and preventing air-bound troubles, and large pressure areas which require less oil pressure per ton of lifting capacity.

New Battery Hydrometer



E. Edlmann & Co., 2332 Logan Blvd., Chicago, Ill., makers of hydrometer testers, has announced a new hydrometer for battery testing, designed to cope with the requirements of today's new high-speed battery chargers. This new Hy-Rate Thermo Hydrometer, known as No. 55, has a temperature range up to 160 deg. to give accurate readings during the fast charging of batteries, to provide control of battery temperature. The large thermometer scale, combined with the features of Edlmann testers, make this a necessary tool.

Gunk Announces

Two New Products

Gunk Compound H-S is one of the latest products to be announced by The Curran Corp., Malden, Mass. This product is designed for cleaning carburetors, fuel pumps, Diesel fuel injectors, and similar parts through its decarbonizing action. Operates as a cold bath cleaner.

Another product announced at the same time is Tarlene, a chemical sol-

vent for road tar. It features the phrase, "Count up to 6," illustrating the quick action of which this product is capable.

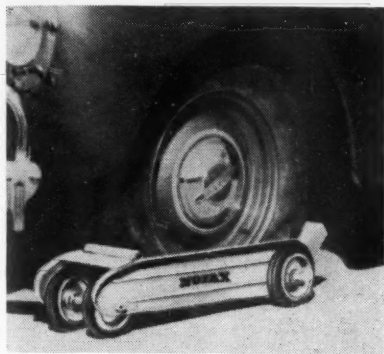


Piston Peining Hammer

A new peining hammer, designed to operate from the regular shop air line, has been made available by the Hastings Mfg. Co., 375 E. Mill St., Hastings, Mich., through Hastings jobbers under the company's service tool plan in connection with a selection of Steel-Vent engineered ring sets. The hammer will resize and expand either cast iron or aluminum alloy pistons in the cylinder so that positive fits can be assured for each individual cylinder. Fast and easy to operate.



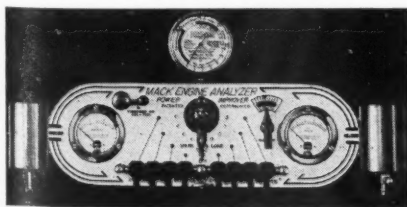
Emergency Tire Service



Nojax, an emergency flat tire truck, has been introduced by the Cello Products Co., East Boston, Mass. As shown in the illustration, when a wheel has a flat tire, Nojax is placed on the ground in front of the wheel and the car rolled up on it until the wheel with the flat tire drops into the cradle of the truck. A short ramp is provided to permit the wheel to roll up on to the truck, and, as the wheel settles in place, the ramp is forced up to securely lock the wheel in position. Permits driving the car to a service station where the tire can be changed. Operates equally well on front or rear wheel. Price \$9.95.

Mack Engine Analyzer

A new engine analyzer has been announced by the Mack Products Co., Winthrop, Mass. Several outstanding features are claimed for this unit by the manufacturer, such as testing spark plugs under load in the engine; testing points, coil and condenser with the engine running; testing the Ford ignition without removing the distributor and locates defective coil, points and condenser; testing fuel pump and fuel feed for pressure, suction and volume; testing and adjusting carburetors. The unit can be detached from the stand and used as a portable unit for testing tanks, tractors, airplanes, motor boats, etc.



Combination Cleaner and Polish

Car-Glo is the name of a new combination cleaner and polish for automobile finishes, and has been announced by Albion & Sons, Cambridge, Mass. It is claimed to perform the operations of cleaning and waxing in one operation without injury to the finish, removing traffic film and leaving a hard, lustrous

waxed surface. Easy to apply; no hard rubbing necessary. List price \$.39 per pint.

Radiator Cleaner

A new product known as Rustbuster has been placed on the market by the Cannon Chemical Co., Inc., 210 Broadway, Everett, Mass. It is made in two strengths, the Original Rustbuster for the average radiator, and Rustbuster Flush for the badly clogged radiator. The Original is said to dissolve the rust and clarify the water, without having to drain the system. Rustbuster Flush can be poured into the badly clogged system, allowed to remain two or three days, and then drained out; or it can be used to clean the system out immediately, according to the manufacturer. Original Rustbuster has a list price of \$1.00 per pint; Rustbuster Flush lists for 75c.

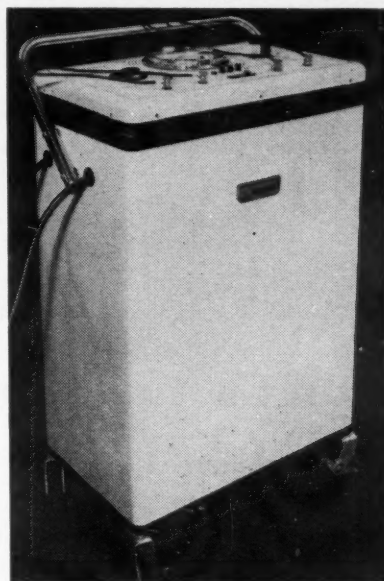


Hot Water Heater

An abundant supply of hot water is a necessary item in any shop, and the new Stokol-Hot Water Heater announced by the Schwitzer-Cummins Co., of Indianapolis, Ind., is designed to fill this need. Made in different models to burn soft or hard coal, this new heater will supply a large volume of hot water at a cost of only a few cents a day, according to the manufacturer. There are controls for keeping the hot water supply at uniform temperatures, and to control the operation of the stoker for the least possible consumption of fuel.

Fast Charger

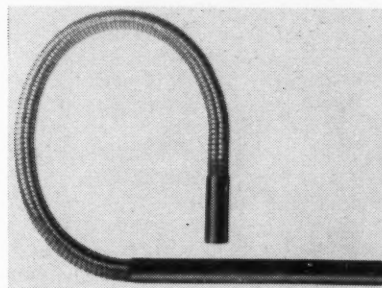
One of the latest companies to announce the introduction of a battery fast charger is Jos. Weidenhoff, Inc., 4844 West Roosevelt Road, Chicago, Ill. The Cyclone, identified as Model 555, has a built-in battery analyzer to determine the condition of the battery before charging. Another feature is a device for testing and adjusting voltage regulators by increasing the battery voltage so that it is not necessary to install temporarily a fully charged battery in the car. An automatic time switch controls the length of time the charger operates at the high charging rate. The entire unit is mounted in a steel cabinet and



equipped with swivel casters, two of which are provided with brakes.

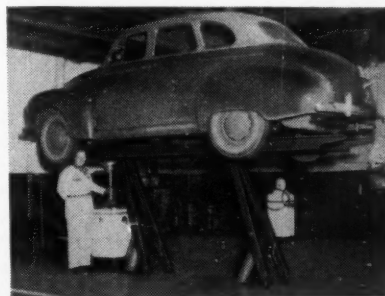
Flexible Tail Pipe

Aluminum Industries, Inc., 2416 Beekman St., Cincinnati, Ohio, makers of Permit replacement parts, has announced a new flexible tail pipe. Constructed of heavy wall interlocked steel tubing, this pipe is easily shaped by hand to fit the understructure of any vehicle. A 16 in. nipple at one end provides a means of shortening the pipe where desirable without cutting the flexible tubing.



New Style Lift

The Kellogg Division of American Brake Shoe & Foundry Co., 97 Humboldt St., Rochester, N. Y., has introduced a new style free-wheeling lift. Its two pistons and supporting standards provide a sturdy support while the car is on the lift. The manufacturer states that it is economical to operate and easy to install.

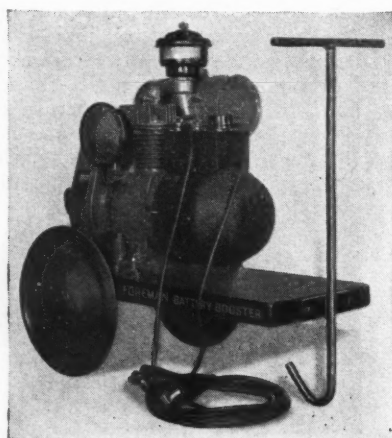


NEW profit makers

PARTS TOOLS EQUIPMENT ACCESSORIES

Gasoline Powered Battery Charger

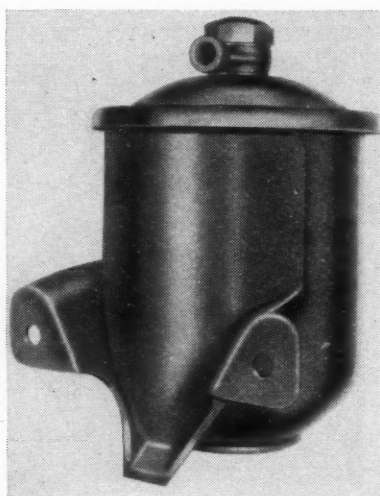
To meet the need for a type of battery quick-charger that can be used in camps, service station, aviation fields, car lots, etc., where mainline power is not available, W. D. Foreman, 5359 South State St., Chicago, Ill., has developed a new, gasoline powered quick charger. The charger is driven by a small gasoline engine of the four-cy-



cle type, equipped with an air cleaner and a float feed carburetor. The motor has 50 per cent over-capacity, and is capable of delivering a full charge in 40 min., according to the manufacturer.

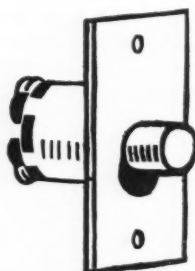
Replacement Filter Has Integral Bracket

A new replacement element oil filter designed especially for the conversion of Chrysler-built cars equipped with Purolator cartridge-type filters has been announced by Purolator Products, Inc., Newark, N. J. This new unit, identified as NE-1517, is manufactured with a mounting bracket spot-welded to the filter housing. It is so designed that it is no longer necessary to remove a cylinder-head bolt to mount the filter on the engine block, thereby eliminating the necessity for draining the cooling system. It is shipped with an elbow fitting installed in the inlet at



the top of the filter so that the oil line can be connected directly to the filter, using the outlet elbow from the old unit as the bottom connection for the new one.

Door Switch



This new door switch, developed by Cole-Hersee Co., 54 Old Colony Ave., Boston, Mass., is of heavy duty construction. Made of turned brass, chrome plated plunger with a heavy interior construction, it is said to be entirely trouble-free.

Lincoln Adds New Items

Lincoln Kleenseal fitting display assortment No. 5582, and Lincoln High Pressure Lever Gun display packages are the latest additions to the complete line of lubricating equipment manufactured by the Lincoln Engineering Co., 5701 Natural Bridge Ave., St. Louis, Mo. The fitting display assortment contains 455 fittings in all, packed in display cartons which can be opened and displayed on the

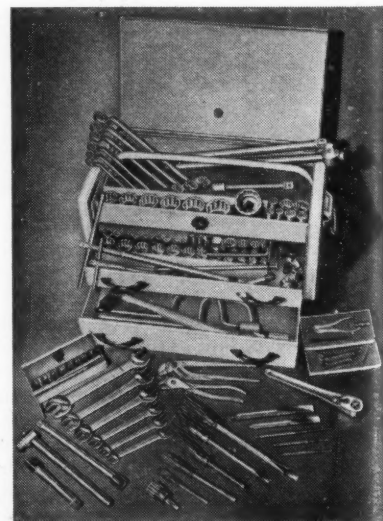
counter. The pressure lever gun display packages are likewise designed to provide attractive display pieces when opened and placed on the counter.

Finish Freshener

A polish designed for new or recently waxed finishes has been announced by the McAleer Mfg. Co., 2431 Scotten Ave., Detroit, Mich. Known as Finish Freshener, this new polish has a two-way action; gently cleans the surface, and deposits a protective film over the finish. This film is very thin, and polishes to a hard, brilliant lustre with little effort. When used each time the car is wiped off, it will preserve the finish and keep it looking new, according to the manufacturer.

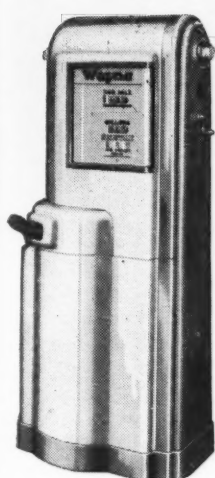
Tool Chest by Duro

A new tool chest including a complete range of sockets from 1/4 in. to 1 1/2 in., socket adapters, fittings, box wrenches, end wrenches, punches and chisels, screw drivers and pliers, has been introduced by Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill. The chest is made of heavy gage metal, finished in chinese red baked enamel and has a built-in lock. It is equipped with two drawers and a tote tray.



Gas Pump Embodies

New Features

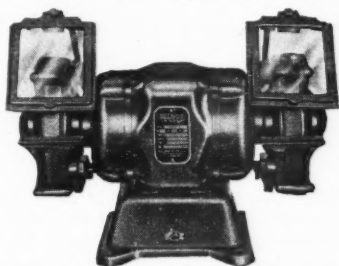


Outstanding feature of the new Wayne Model 100 computing pump recently announced by The Wayne Pump Co., Fort Wayne, Ind., is the design and location of the hose reel. This reel operates horizontally at the height of the average gas tank filler cap, so that seldom more than 3 or 4 ft. of hose is used to serve the car. The hose has an adjustable tension and latches automatically every 8 to 10 in., and retracts with a slight outward pull. Another feature is that the pump will serve a car as far away as 14 ft. from the pump. Entirely new in styling, the new pump is Wayne's golden anniversary contribution to the industry.

Baldor Has New

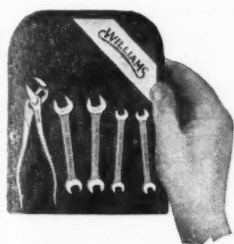
Bench Grinder

The Baldor Electric Co., 4351 Duncan Ave., St. Louis, Mo., has developed a new 6-in. grinder, designated as No. 612. This grinder is rated $\frac{1}{2}$ hp. and is furnished with 6-in. diameter $\frac{3}{4}$ -in. wide wheels, and is equipped with fully enclosed guards. Tool rests are adjustable horizon-



tally and vertically, and may be tilted for angle grinding. Adjustable shatter-proof eye shields are included.

Electrical Wrench Set



Consisting of four midget size "Superrenches" with openings at 15-deg. angle, and midget "Superplier" with four-position

slip-joint action, this new set is designed for such electrical service as fog lights, heaters, spot lights, back-up lights, and radios as well as distributors, ignition systems, instrument panel work and carburetors.

Thin Flexstone

Rinck-McIlwaine, Inc., 16 Hudson St., New York City, has announced an extra thin and fine Flexstone for dressing voltage regulator contact points. The abrasive stone is hard enough to dress tungsten, yet is flexible and thin enough to work in close quarters.

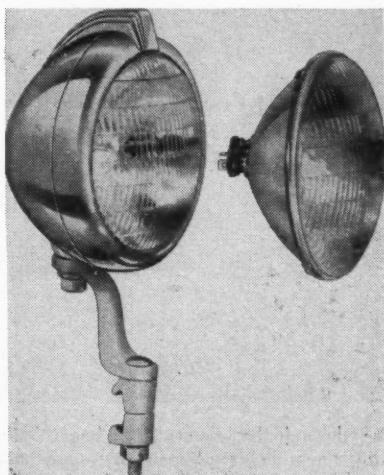


Zecol Polish

A new product, known as Zecol Minute Polish, has been introduced by Zecol, Inc., Milwaukee, Wis. According to the manufacturer, it cleans and polishes in one operation, is easy to apply, and is recommended for all types of colors of lacquers and enamels. Sold in shop size only.

Auxiliary Lights

The increasing demand for improved lighting for night driving has led to the introduction of new auxiliary lights by the Auto Radiator Mfg. Co., 2901 Indiana Ave., Chicago, Ill. Made to be easily installed on any make of car prior to 1940 models, these new lights are made for use with the Mazda sealed-beam light unit. Attractive floor and window displays are supplied by the manufacturer, along with a chart showing the type of unit for each make and model of car.



Electrical Analyzer



The latest addition to the line of electric tune-up and analyzing equipment made by the Electro Products Co., 621 East 216th St., New York City, is the Electro Trouble Shooter. This instrument features an extremely sensitive leak detector and a D.C. voltmeter for checking voltage of battery, generator, starting and lighting circuits. Case is constructed of heavy gage steel and is provided with a tie-rod hanger handle for convenience. Furnished with all necessary leads and completely illustrated operating instructions.

New Type Oil Filter

A new type oil filter which can be repacked by the mechanic instead of having to replace the complete filter cartridge has been announced by The Bolser Corp., Cedar Falls, Iowa. Material for repacking is the same as originally used by the manufacturer, and is supplied in either a 6-oz. and 8-oz. sealed package, or in 50 and 100-lb. bales. The Bolser Re-Pak-It cartridge is available for use in all popular filters.



Brake Lining Package

Mak-A-Set brake lining packages, which consist of short roll, wire-back, molded lining packed in a container made of brake shim stock material, are available from the Triplewear Brake Linings Corp., Paterson, N. J. Each package contains two 15-ft. coils of a size in two frictions. Three sizes of lining may be obtained: $1\frac{1}{2}$, $1\frac{3}{4}$ and $2\frac{3}{16}$ in. A special shim cutting tool and ruling devices on the package are provided for accurate shim cutting. A brake chart and a flat rate system of computing the cost of brake jobs are furnished with the package of materials.

NEWS

Detroit News Letter

By Ed Warner

An initial cut of 20 per cent in 1942 model automobile production, effective beginning Aug. 1, is not expected to prove too drastic for dealers, as it still will allow an output of approximately 4,000,000 units for the next model year. It is understood that quotas will be assigned to the various automobile companies for the first six months of 1942 model production, namely through January, 1942, when it is presumed that the OPM will review the situation and decide whether any further reduction is necessary.

The 4,000,000 quota has been exceeded by eight model years in U. S. automobile manufacturing history, namely 1923, 1925, 1926, 1928, 1929, 1936, 1937 and 1940. However, when it is realized that somewhat in excess of 2,500,000 cars will be scrapped during the 1942 model year, according to

past experience, this does not allow for a great expansion of the market, considering the amount of money that will flow into trade channels due to accelerated defense spending. The used car market is certain to improve and the service field will expand as owners drive their cars for a longer period. Some observers look for a 10 per cent rise in retail prices due to higher taxes, material and labor costs.

Output of 1941 models since last Aug. 1 in U. S. factories was estimated at 3,750,000 passenger cars and trucks up to May 1, with the last three months of the model year expected to boost the total close to the 5,000,000 mark. This has been exceeded only by 1929's record total of 5,359,090 units in U. S. plants.

In announcing the 1942 model curtailment in Washington April 17 after



LO, THE RICH INDIAN. Willie Taylor, 24-year-old Seminole, fills tanks at a Tulsa, Okla., station for \$18 a week despite his reputed fortune of \$8,000,000. Government limits his allowance to a mere \$75 a week.



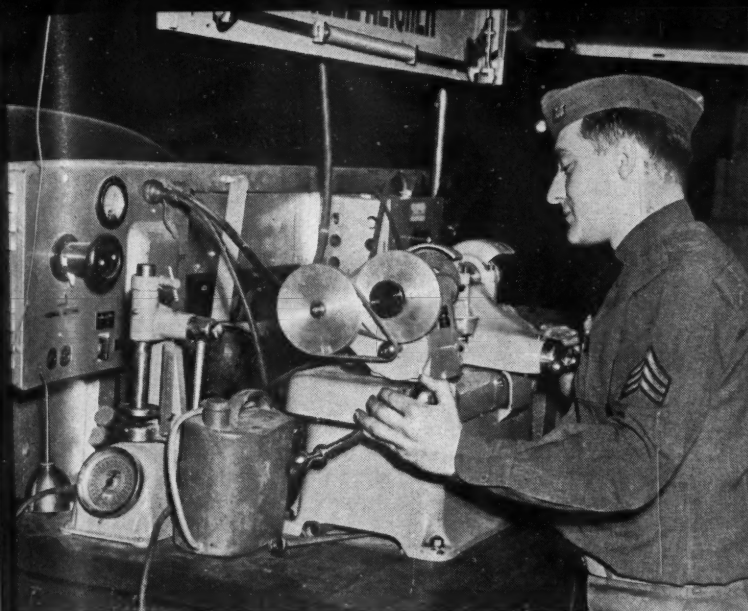
BOSS. Despite the fact that he is only 23, Roy Lyon has full charge of the service department of J. A. Herzog, San Francisco Pontiac dealer. Herzog believes that Lyon is the country's youngest service manager.



MAMMOTH AND MIDGET. Small truck, crawling through the narrow ditch beneath the huge six-wheel vehicle that spans the cut, emphasizes the wide variation in size among the trucks now being used by the U. S. Army. The shot was made at Fort Benning, Ga.

a meeting with leaders of the automobile industry, William S. Knudsen, director of the OPM, said, "The entire industry willingly accepted an initial 20 per cent reduction in the production of motor vehicles for the model year beginning Aug. 1 this year, in order to make available more manpower, materials, facilities and management for the defense load now being made ready. The reduction will amount to approximately 1,000,000 units."

On the basis of 1940 output of cars and trucks, it is estimated that the following savings in defense materials will result from the 20 per cent cut



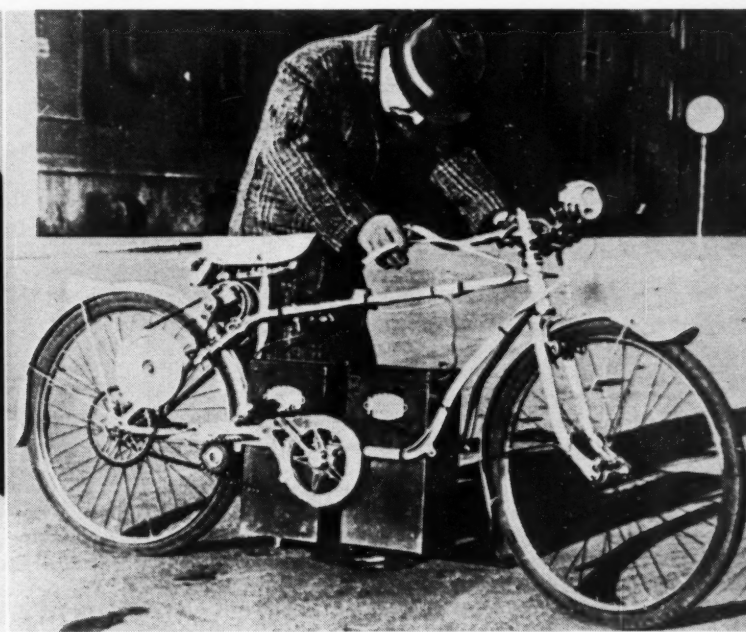
MOBILE MACHINIST. Sgt. Albert Person, Trenton, N. J., operating valve refacer in one of the new mobile machine shop and repair units the Army has just assigned to the 119th Ordnance Company at Fort Dix, N. J. Use of these workshops on wheels is expected to increase rapidly as the Army continues to acquire necessary mechanized equipment.



BLACKOUT CHANGE. Blindfolded, Private William Salle, of Fort Custer, Mich., removes a truck tire to acquire skill necessary to do the job in a blackout. He is one of the 21 soldiers from different camps taking the month's course being provided for Army men by the Goodyear Tire and Rubber Co.



STILL GAME. Capt. E. V. Rickenbacker, president of the Eastern Air Lines and the Indianapolis Motor Speedway, discusses plans for Memorial Day classic with T. E. "Pop" Myers, track's general manager. Despite painful injuries suffered in an airplane crash near Atlanta, Ga., Rick promised to be on hand for race "even if I have to use roller skates."



WAR-TIME BIKE. Diversion of gasoline to war uses has curtailed civilian motor transport in Germany and many Berlin residents, like the one shown, get about the city on bicycles driven by dry-cell batteries. This bike uses two batteries, which permit it to travel about 63 miles without recharging.

in 1942 model production: steel, 1,437,262 net tons; malleable iron, 68,582 tons; gray iron, 227,311 tons; crude rubber, 113,569 long tons; plate glass, 28,230,000 sq. ft.; aluminum, 5,235 tons; copper, 26,400 tons; tin, 2,400 tons; lead, 54,700 tons; zinc, 18,200 tons; and nickel, 2,398 tons.

So its tool shops may be available for defense work, General Motors has announced it will dispense with 1943 model changes. Work on the 1942 models, whose design changes will include elimination of critical materials, is going forward and they will be introduced this summer. In a letter to the OPM, A. P. Sloan, Jr., GM

chairman, said the 1942 models would be continued through 1943. This will effect a \$35,000,000 to \$40,000,000 saving in tooling costs, as well as in use of tooling equipment and technical talent. Ford and Chrysler officials both stated that national defense work comes first, but they had no definite announcement on 1943 model changes.

Despite the 10-day strike at the Ford Rouge plant, which reduced output considerably by a manufacturer that accounts for approximately one-fifth of the cars produced in the U. S. and Canada, April production was estimated at 462,000 units. This was

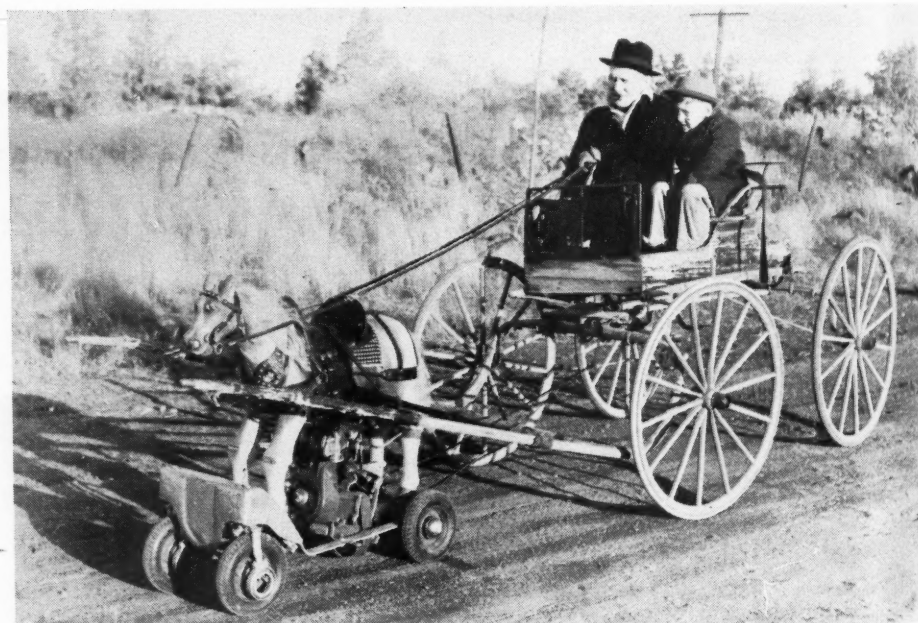
the best April since 1937, and surpassed April, 1940, by about 10,000 vehicles.

Retail sales for March totaled 525,798 new passenger cars and trucks, according to the AMA, the largest for any month in the last 10 years and 31 per cent higher than March, 1940. Previous high mark in this period was 485,102 units in March, 1937. March passenger car sales were 449,597 units, up 33 per cent from a year ago, and commercial car retail deliveries totaled 76,201 units, a gain of 26 per cent. General Motors delivered 608,702 cars at retail in the first quarter this year, 45 per cent above 1940.



STAR RISING. As attendant at a filling station in Los Angeles for four years, Don Alden King served many movie moguls as well as stars, but none recognized until lately that King had the face and personality for pictures. Now David O. Selznick has signed him to a contract and is laying plans to build the ex-attendant into a movie star.

ONE HORSEPOWER. Roy Sheldon, Redmond, Ore., mechanic, driving the strange vehicle he fashioned from cream separators, washing machine, lawn mower, and Ford parts. The "horse" pulls the wagon at 15 m.p.h. and is steered by the reins. When displayed at shop where Sheldon is employed, it drew big crowds and increased business considerably.



Ford Reveals Plane Engine Details

Further details of the liquid-cooled aircraft engine being developed by the Ford Motor Co. were given in a brief talk by C. W. Van Ranst, Ford's chief aircraft engineer, at the ASTE Convention in Detroit. According to the projected plans, the Ford engine is to be of V-type, 12-cylinder, liquid cooled, with a displacement of 1650 cu. in. (same as the Liberty engine). Stroke is given as 6 in., which places the bore at approximately 5.4 in. On the basis of test results with the two-cylinder test engine, the output of a production engine is expected to range between 1800 and 2000 hp. at 3600 rpm. Compression ratio is 7.5 to 1. Present estimates place the weight of the engine, complete with

accessories, at around 0.9 lb. per bhp.

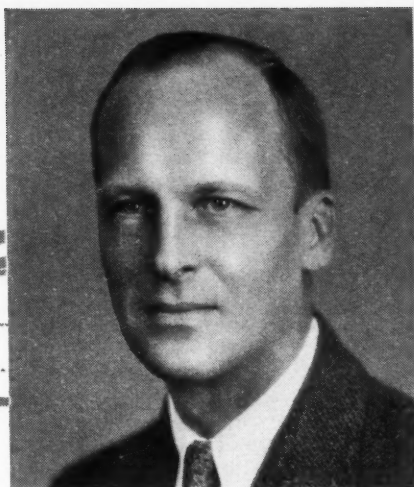
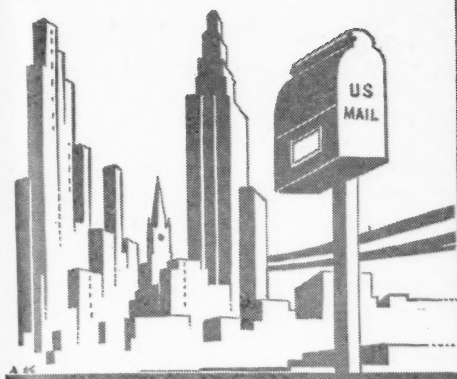
In design the Ford engine exhibits features quite novel in aircraft engines but common to automotive practice, since it follows many of the principles inherent in the Ford V-8. For example, the cylinder block and crankcase are of aluminum and cast en bloc, fitted with centrifugally cast, heat-treated steel, dry liners. The crankshaft will be cast by the same methods as is the V-8 shaft, counter-balanced, and of extremely rigid construction. Side-by-side connecting rods with floating bearings are employed as on the V-8. Pistons are practically "square" to improve cooling and ring performance.

(Continued on page 92)

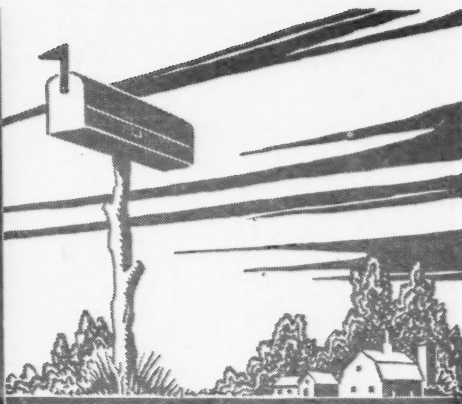
New Passenger Car Registrations*

	FEBRUARY	JANUARY	FEBRUARY	TWO MONTHS		Per Cent Change, 2 Months, 1941 over 1940	Per Cent of Total Two Months		FIVE MONTHS MODEL YEAR		
	1941	1941	1940	1941	1940		1941	1940	1941	1940	Per Cent Change
Chevrolet	73,682	71,151	55,661	144,833	121,606	+ 19.0	24.15	25.08	376,728	271,191	+ 39.0
Ford	54,591	52,088	37,742	106,679	80,566	+ 32.4	17.79	16.62	249,662	206,356	+ 21.0
Plymouth	34,515	35,219	28,923	69,734	61,910	+ 12.8	11.63	12.77	186,324	128,123	+ 45.5
Buick	24,400	26,273	17,749	50,673	40,857	+ 24.1	8.45	8.43	139,665	115,827	+ 20.6
Pontiac	23,767	22,346	14,045	46,113	30,218	+ 52.6	7.69	6.24	117,649	80,677	+ 45.8
Oldsmobile	19,606	19,247	12,508	38,853	26,649	+ 46.0	6.48	5.50	99,107	73,414	+ 35.0
Dodge	15,179	16,661	14,556	31,840	31,070	+ 2.6	5.31	6.41	75,482	58,189	+ 29.5
Chrysler	10,405	10,801	7,073	21,206	14,447	+ 47.0	3.54	2.98	48,806	26,508	+ 84.0
Studebaker	7,531	7,991	6,569	15,522	13,716	+ 13.0	2.59	2.83	42,439	39,455	+ 7.2
Mercury	6,824	7,061	5,610	13,885	12,344	+ 12.6	2.32	2.55	33,480	30,794	+ 8.9
Nash	6,594	5,607	3,582	12,201	7,917	+ 54.0	2.03	1.63	25,326	21,821	+ 16.0
De Soto	6,023	6,132	5,076	12,155	10,213	+ 19.0	2.03	2.11	30,074	19,873	+ 51.0
Hudson	5,182	5,423	5,216	10,605	10,953	- 3.1	1.77	2.26	30,934	35,535	- 13.0
Cadillac	4,685	5,145	2,237	9,830	5,122	+ 92.0	1.64	1.06	23,709	15,571	+ 52.2
Packard	4,087	4,496	4,875	8,583	10,146	- 15.4	1.43	2.09	27,120	33,259	- 18.5
Lincoln	1,544	1,639	1,543	3,183	3,551	- 10.4	.53	.73	8,646	8,848	- 2.2
Willis-Amercar	1,497	1,488	1,479	2,985	3,157	- 5.4	.50	.65	7,831	8,945	- 12.5
Graham	85	133	24	218	60	+263.0	.04	.01	749	310	+141.5
Crosley	26	42	36	68	87	- 22.0	.01	.01	179	245	- 26.9
Bantam	18	25	97	43	175	- 75.4	.04	.04	142	427	- 66.8
Miscellaneous	225	211	24	436	47	+828.0	.07	.07	1,582	174	+788.0
Total	300,466	299,179	224,625	599,645	484,841	+ 24.0	100.00	100.00	1,525,634	1,175,542	+ 29.8
Chrysler Corp.	66,122	68,613	55,628	134,935	117,640	+ 14.8	22.50	24.26	340,686	232,693	+ 46.5
Ford Motors	62,959	60,788	44,895	123,747	96,461	+ 28.0	20.64	19.90	291,788	245,998	+ 18.8
General Motors Corp.	146,140	144,162	102,200	290,302	224,482	+ 29.0	48.41	46.30	756,858	556,680	+ 36.0
All Others	25,245	25,416	21,902	50,661	46,258	+ 9.8	8.45	9.54	136,302	140,171	- 2.5

*Includes Federal Government deliveries.



Bill Toboldt, Editor, Motor Age



THE READERS'

CLEARING HOUSE

of Servicemen's Queries

USE A TORQUE WRENCH

We have a problem to unscramble. It is a 1934 Plymouth. We can't drive this car more than 55 m.p.h. or the pistons will seize and score. Scored No. 6 with the original piston, after 62,000 miles of service.

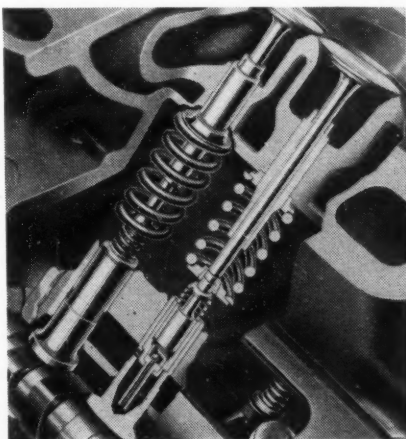
The first time this happened we honed all cylinders to .020 in. oversize, and in the next 2000 miles three pistons stuck. Pulled the engine down and bored all cylinders to .050 in. oversize and installed a reground crankshaft with .010 in. undersize bearings. Oil spray holes in rods are open; using 10W oil, and oil pressure is 50 lb. cold, 30 lb. at 50 m.p.h., and 10 lb. at idle when hot.

I think these pistons are starving for oil at high speed, but am unable to find the reason. Do you think it is the oil pump? B. C. Laub, Cherokee, Iowa.

I THINK a probable cause of the trouble would be distortion of the cylinder block. This distortion would be caused by either a clogged cooling system or uneven tightening of the cylinder head. I would suggest that

you thoroughly flush out the engine water jacket and then, after the head is installed, pull up the head bolts with a tension wrench. I would also advise making a careful check of the connecting rods to make sure that they are straight and have not been sprung.

I think it would also pay to check the oil pump, but I think the most likely cause of your trouble would be found in distortion of the block.



STICKING VALVE

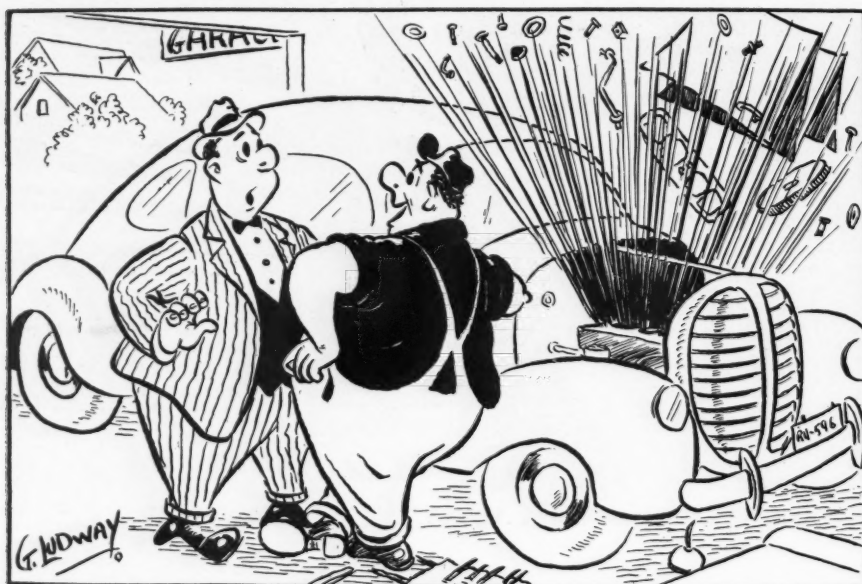
I have a 1939 Model 60 Cadillac which has a miss on an acceleration at about 40-50 m.p.h. I have installed several sets of spark plugs of different types, a new coil, new condenser, new points and have checked the carburetor and the fuel pump on an analyzer. Nothing seems to correct this trouble. Edgar Worthington, Wilkes-Barre, Pa.

YOUR letter does not mention that any work has been done to the valves in this engine, and it is my opinion that this trouble is caused by a valve that is sticking. I suggest that you clean the carbon and grind the valves, as I believe this will correct the trouble.

LOW OIL PRESSURE

Here's one I hope you can help me with. It is a 1939 Studebaker Commander.

I installed new rings, one new connecting rod and a complete set of main bearings. Also closed the oil spray holes in the rods. Now the en-



"Listen to her knock 'em off now!"

gine has an oil pressure of only 19 lb. at 50-60 m.p.h., instead of the standard which is 35 lb. at 35-40 m.p.h.

The by-pass valve in the oil pump was leaking, so I fixed that, but still the oil pressure will not come up as it should. The bearings have been checked with an oil pressure tester and found to be satisfactory, and I don't know what to do next. Melville Rief, Madford, Wis.

YOUR oil pressure test would seem to indicate that there is no undue oil loss at any of the bearings, and it is my opinion that, if you will install new gears in this oil pump, you will be able to bring the pressure up to standard. It is quite possible that the oil gears are worn so that they are not developing as much pressure as they should.

CARBURETOR INFORMATION

Would like some information on a Zenith carburetor Model 23-AV-10 used on a D-2 International pick-up truck.

There is a miss in this engine at about 20 m.p.h., or when the throttle is opened slowly. It runs all right at low and at high speed. I installed a new vacuum cylinder and also a power jet valve, with no success.

The ignition is in good shape. New rings have been installed and the valves ground. There are no leaks in the manifold, and the fuel pump tests O.K.

Please give the correct fuel level for this carburetor. Charles Ogilvie, Carthage, Ill.

THE float level in this carburetor should be $1\frac{1}{2}$ in., and is measured by removing the bowl cover and float assembly, turning it upside down, and

measuring from the bottom of the float to the rim of the bowl cover.

I am inclined to believe that your trouble is caused by an improperly operating accelerating pump in the carburetor, though it would also pay to check again for sticking valves.

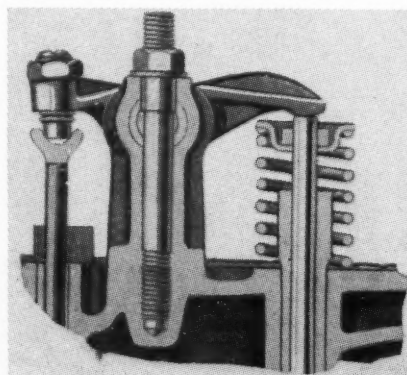
VALVE KEYS PULL

THROUGH SEAT

Here's a new one for you—a 1933 Chevrolet that pulls the valve keys through the key seat on top of the springs.

The first time it occurred, the valve was noticed before dropping into the cylinder, and was keyed in without removing the head. The second time another valve dropped down in the cylinder, smashed the piston and bent the connecting rod. I replaced the piston and rod with new ones, ground the valves, recut seats, put in one new spring and valve guide, and put new key seat washers on all valves.

Last week this car came in again with two valves stuck and two pulled through the key seat washers, but did not drop down into the cylinders. Two pistons were broken and two were



battered from fragments of broken pistons entering through the intake manifold.

The customer installed a winter front immediately after the valves were ground, which I think caused it to overheat and break the pistons the last time, but I am unable to determine what causes the keys to be pulled through the key seat washers. Wilson B. Mark, Loganton, Pa.

THE only thing I can think of that would cause this trouble is valve springs that are too long or that have more coils than the standard springs, causing the spring to bottom as the valve opens. If this condition occurs, the rocker arm would have a tendency to push the valve stem against the spring seat and, of course, would force the key through the seat.

The other point that occurs to me is that this car may have the wrong type valves in that the valve stems are too short. This would bring about the same condition.

My suggestion is that you replace all the valve springs and valve spring seats in this car with standard springs for this model, and that you also compare the valves with standard valves to see that they are the right length.

EXHAUST VALVES STICK

We have a 1937 Packard Super Eight which is giving trouble with exhaust valves sticking. These valves stick so badly that it takes a 6-ft. lever to pry them out. The stems get very dry and a hard deposit forms on the stem. When this gets thick enough, the valves stick.

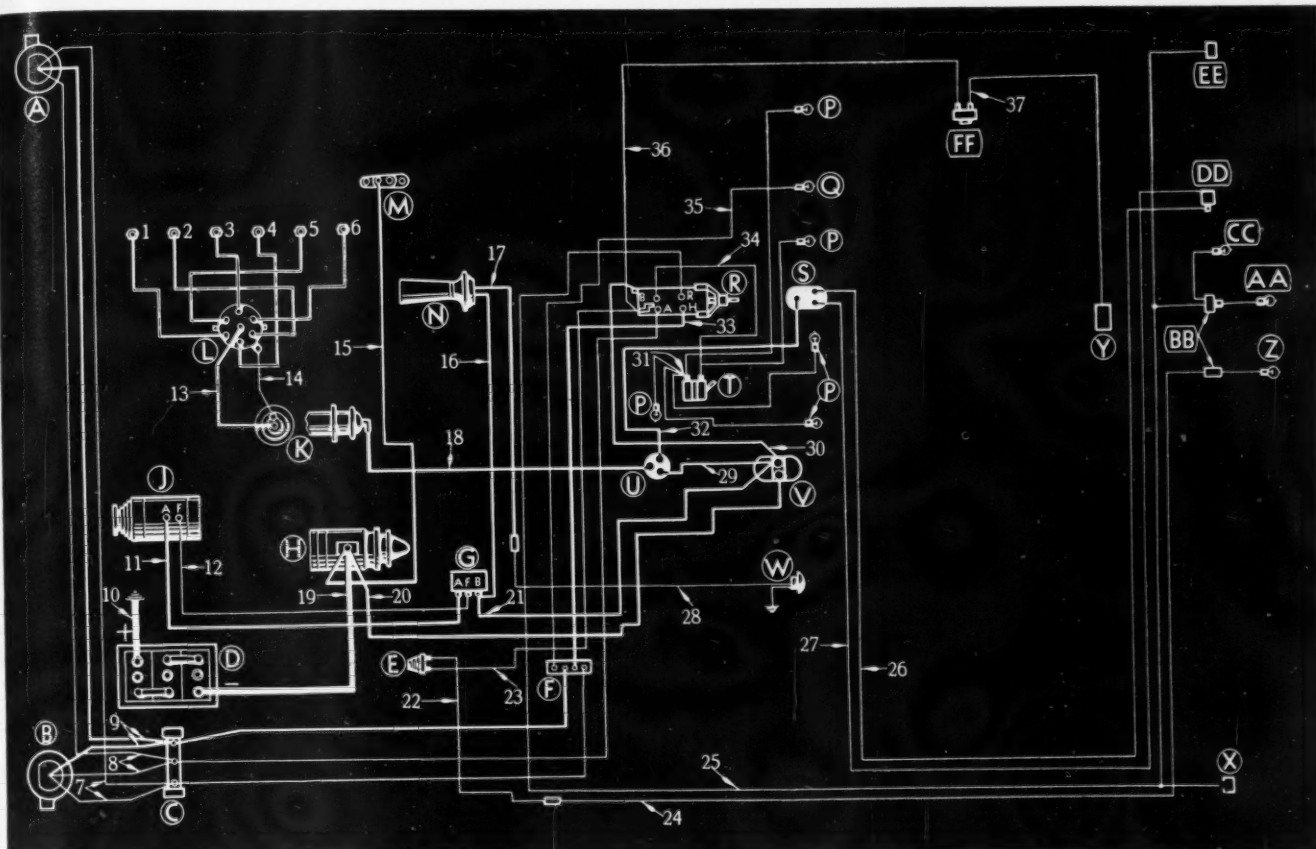
Have tried various oils, and have counter-bored the valve guides to a depth of $\frac{3}{8}$ in., but this did no good. R. C. Wolfel, Marion, Ohio.

SINCE you have made several attempts to correct this condition, before you do anything else, I suggest that you change to a different brand of oil and gasoline. There is a difference of opinion as to whether the deposit of varnish is caused by oil or by gasoline, and, in your particular case, I suggest any good grade of oil that uses an inhibitor to prevent the formation of varnish, and a different grade of gasoline from that which you are now using. I would give this a trial before attempting any further mechanical work.

In addition to this, I would, at regular intervals, give the engine an application of a solvent oil through the carburetor to help keep the valve stems and piston rings clean.

BULBS BURN OUT

We are having trouble because of burning out headlight bulbs in a 1933 Pontiac. For a period of two weeks, more or less, there will be no trouble.



1941 Dodge Wiring Diagram

A—Headlight and parking light, right
 B—Headlight and parking light, left
 C—Headlight cables terminal block
 D—Battery
 E—Signal light switch
 F—Headlight dimmer foot switch
 G—Voltage regulator
 H—Starter motor
 J—Generator
 K—Ignition coil
 L—Ignition distributor
 M—Automatic choke
 N—Horn
 P—Instrument panel lights
 Q—Headlight bright beam indicator light
 R—Lighting switch and fuse
 S—Fuel gage (panel unit)
 T—Instrument light switch
 U—Ignition switch and lock
 V—Ammeter
 W—Horn button

X—Tail light, left
 Y—Reading light
 Z—Signal light
 AA—License light
 BB—Cable connectors
 CC—Trunk compartment light
 DD—Fuel gage (tank unit)
 EE—Tail light, right
 FF—Reading light pillar switch
 1—6—Spark plug wire
 7—Black
 8—Yellow
 9—Red
 10—Battery ground
 11—Red
 12—Green
 13—High tension wire
 14—Primary cable (black)
 15—White
 16—Green
 17—Green

18—Ignition switch cable
 19—Starter cable
 20—Red
 21—Black
 22—Red
 23—Red
 24—Red
 25—White
 26—Blue
 27—Black and yellow
 28—Black
 29—Brown
 30—Brown
 31—Black
 32—Blue
 33—Yellow
 34—Black
 35—Brown
 36—Red
 37—Yellow

Suddenly the lights get real bright and then burn out.

The generator output is 12 amps. We have checked the battery and all other connections but haven't found the trouble yet. Can you give us a lead? John McNeese, Westervelt, Ill.

It seems to me that the first thing you should do is to check the electrical circuit with a volt meter to see if you can find the point at which there is a bad connection. You should keep in mind that a tight connection does not necessarily mean a good connection because it may be dirty. Then you should check the voltage regulator to determine its operation and, of course, clean and tighten the battery connections and the engine ground strap.

It is possible that there is a bad connection inside the battery which is causing this trouble, and, if you are unable to find other poor contacts, I suggest that you try running the car with another battery to see if this will correct the trouble. There is, of course, a possibility that the light bulbs you are using are not up to standard, but such a case would be very rare.

SQUEAL IN ENGINE

I have trouble with a 1940 Chevrolet which has a whistle or squeal at a speed of about 45 m.p.h., or at 10 to 15 m.p.h. during acceleration.

I have checked the following: Carburetor, generator, fan blades, oil pump, fuel pump, speedometer and

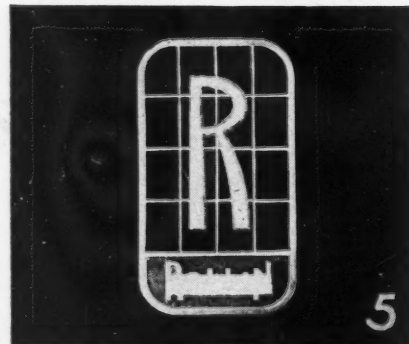
water pump. I also installed a new clutch throwout bearing. None of this work stopped the noise. It can be produced with the car standing still and the engine speeded up to about 45 m.p.h. Millard F. Larson, Fayette, Iowa.

THE first thing I would do would be to run this engine at a speed at which this noise occurs, but with the fan belt removed and the fan held against rotation. This would eliminate the possibility of this noise coming from the water pump.

If the noise is still present after the above test, I believe you will find it in the crankshaft front oil seal, or in other words the leather seal which is installed in the timing gear cover. It will be necessary to replace this seal with a new one.

RECOGNIZE THEM?

Here are a few famous automobile nameplates and emblems. Names have been blanked out, but see if you can recognize them. Identification will be found on page 70



GOOD BRAKES SOMETIMES

I have been fighting brakes on a 1938 Plymouth for some time, and seem unable to solve the riddle. As far as I know, I have done everything possible, with no success.

One day the brakes will be all right, and the next day they will build up pressure until they pull the car to a stop. When cooled off, the car can be driven again for a short distance and then the brakes will lock up.

I have changed adjustments on the master cylinder and replaced the wheel cylinder parts. Finally I replaced the master cylinder, but still have the same trouble.—A. F. Shaw, Cabazon, Cal.

I believe the cause of this trouble is that the flexible lines leading from the tubing to the wheels are decaying to the point where they are shedding some of the rubber and it is getting mixed in the brake fluid and is being carried to the valves in the master cylinder. It is also possible that there is considerable dirt or sediment in the lines themselves in addition to the flexible hose connections.

My suggestion is that you replace the hose connections and at the same time wash out all the lines with alcohol to be sure they are clean. Then by installing new parts in the master cylinder and in the wheel cylinders, I believe you will get properly operating brakes.

COOLING SYSTEM TROUBLE

We have a 1936 Pontiac that throws the water out of the overflow tube. We had the radiator steamed out but this did not stop the trouble.

Someone advised us to take the water circulating tube out of the block, which we did, and that appears to have stopped the trouble. But how is this going to affect the motor in the summer? Will the back of the block run too hot?—Edward McMahon, Bayonne, N. J.

YOU should replace the water circulating tube in this engine in order to have efficient water circulation throughout the block, particularly around the valves. This tube is sometimes the cause of overheating trouble, but, if you remove it and do not install a new one, I feel sure you will run into cooling difficulties during the warm weather. Without it there is a strong possibility that you will burn some valves.

VALVES BURN

One of our customers has a fleet of trucks and pulls trailers with them. Among them there are four V-8 Fords, '38's to '40. These Fords all seem to burn the exhaust valves

on No. 3 cylinders on both banks. This happens from about 8000 to 15,000 miles of running. The trucks are kept in good condition at all times.

I think this trouble might come from the change of mixture due to the use of the vacuum brakes for the trailers. Valve burning is very unusual on Ford passenger cars.

I have heard of similar cases on other V-8's that pull trailers. Do you know if this is a common trouble with V-8 trucks or can you give a good cause for it?—J. H. Behrens, Waverly, Ia.

ONE thing that might cause this trouble is that the carburetor adjustment is too lean for the type of service in which these trucks are engaged. You are right in assuming that the use of vacuum brakes would contribute to this condition if the vacuum line is tapped into the manifold opposite these two cylinders. Naturally, this draws in an extra supply of air and leans the mixture at these two cylinders.

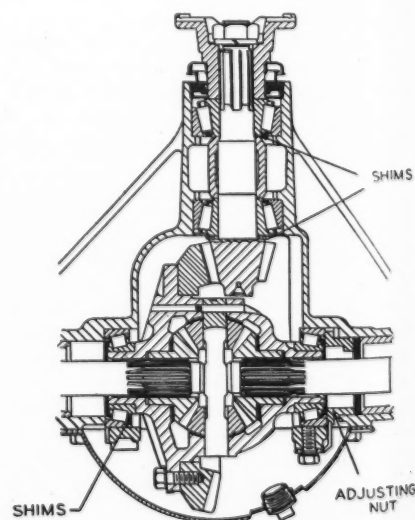
The only thing I know you can do to overcome this condition is to change the vacuum connection at the manifold by moving it closer to the carburetor flange so as not to affect any one particular cylinder and also to richen the carburetor adjustment to counteract the affect of the vacuum brakes.

ADJUSTING

DIFFERENTIAL GEARS

I have been having trouble with a ring and pinion gear adjustment on a 1937 Nash Lafayette.

I installed a new ring and pinion gear and made the adjustments according to specifications. It works fine on a pull, but on deceleration it hums. Have driven the car 100 miles to get some polish marks on the teeth, and they show heavy wear on the heel and light on the toe of the ring gear. How



should I adjust this gear set to eliminate the noise? Joe Petruskey, Mingo Junction, Ohio.

YOUR examination indicates that the pinion gear is too deep in the ring gear, and should be moved out slightly. It is impossible to tell just how much this pinion gear should be adjusted except by actual test. This means that you will have to disassemble the rear axle and remove the pinion shaft so that you can get to the adjusting washers which are located between the pinion and the front pinion shaft bearing. Take out one of these adjusting washers and reassemble the axle and give it a road test. If there is a washer of approximately .002 in. thickness, I believe that by removing that washer it will allow the pinion to come out far enough to eliminate the noise. Without a micrometer depth gage, however, it would be impossible to tell except by actual test just what the setting of the pinion should be.

PULLS TO THE LEFT

I have a 1934 Model 40 Buick. When driving this car on level pavement with an even load, the car will draw on steering wheel towards the left. Wheels are in alinement, have changed tires around, installed new bushings and pins on front wheel assembly, but the car still draws towards the left while driving at any speed from 10 to 65 m.p.h.—Ole Kravik, Madison, Minn.

THIS indicates a misalignment condition. The first thing I would do would be to place the front wheels in a straight-ahead position, remove the front and rear wheel hub caps. Measure from the center of the steering knuckle to the center of the rear axle shaft on the left side and then compare this measurement with the same distance measured on the right side of the car. If there is a difference in these measurements and you are sure the front wheels are straight ahead, it indicates that the rear axle housing is out of line and is responsible for the tendency of the car to travel out of a straight line.

If you find this to be the case, it will then be necessary to line up the rear axle housing by first removing the rear axle and torque tube assembly from underneath the car. Measure from the front end of the torque tube to the outer flange on the end of the axle housing. Make this measurement on both sides of the torque tube and then by adjusting the strut rods which support the torque tube to the axle housing, you can align the torque tube with the housing so that these measurements are exactly equal on each side.

The next thing I would do would

be to disconnect the drag link from the steering pitman arm and locate the steering gear on its high point. Then I would go through the three points of adjustment for the steering gear itself so as to be sure that all lost motion was removed. Then with the steering gear resting on the high point, reconnect the drag link, and then check the front wheel alinement. Check the toe-in carefully, measuring from a center point on the frame out to each front wheel brake backing plate to be sure that the amount of toe-in you have is the same on each wheel.

WHICH IS WHICH?

Will you please tell me the cylinder numbering system used on the 12- and 16-cylinder Cadillac, and the Lincoln-Zephyr? Which cylinder is No. 1? Anthony Peccano, Philadelphia, Pa.

THE front cylinder of the left bank is known as No. 1 cylinder, and this applies to the Cadillac as well as to the Lincoln-Zephyr. The firing order is usually given with the letters "L" and "R" after the number, indicating the left or right banks of cylinders.



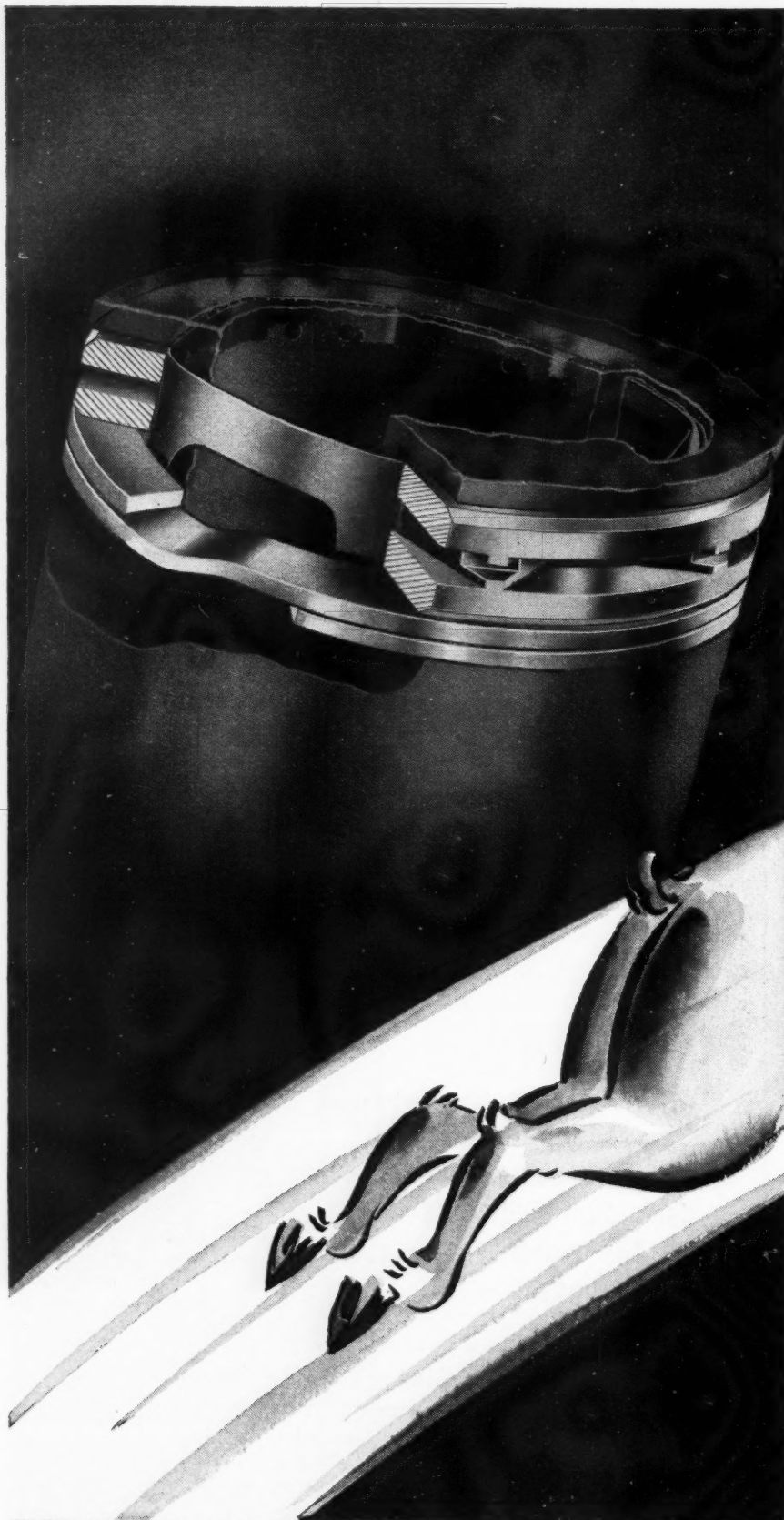
**Replace it
with a New Departure**

**... the same bearing that
competent engineers choose
for the majority of original
installations.**



Authorized replacement bearing service wherever you see this sign. Authentic records—complete stocks—sudden service.

NEW DEPARTURE
THE FORGED STEEL BEARING

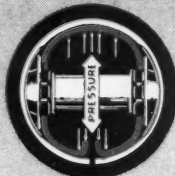


RAMCO DOUBLE LIFE PRINCIPLE

insures a cushion of cast-iron on cylinder wall... the inner ring spring tension is on the cast-iron segment... not the steel!



RAMCO PISTON EXPANDERS

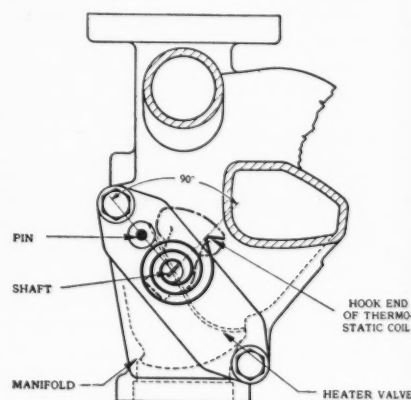


exert pressure only against the thrust sides... the only sides that need expansion! For all pistons including Ford Steel and Chevrolet cast-iron pistons.

SERVICE FROM THE

Flat Spot

Should a flat spot occur on acceleration on a 1941 Studebaker President, the first check should be of the operation of the heat control valve. If the valve is stuck in a closed position a flat spot or sluggish operation will result.



Shifter Change

A change has been made in the shifter rods of the 1941 Pontiac Streamliner and Custom Torpedo models. A single shifter rod is now used in place of the two shifter rods and the idler lever used in early production models.

Only the new parts will be supplied for service, and the old parts are to be discarded. The new items which replace the old are: No. 506712 Gearshift Control Rod; No. 506713 Transmission Shifter Lever; and No. 505760 Gearshift Control Shaft Idler Lever.

Clutch—1940 Models

Poor release of the clutch on 1940 Pontiac cars may be caused by the anti-rattle spring wearing into the clutch pressure plate and binding at the end of the spring.

To remedy this condition, remove the clutch and carefully examine the pressure plate and anti-rattle spring for indications of interference which might prevent easy and complete operation. Smooth up the pressure plate so that a good bearing is provided for the face of the anti-rattle spring. Also see that it does not have any end thrust by shortening the end of the

HINTS

FACTORIES

spring. Coat with Lubriplate and re-assemble.

Some mechanics have filed the driving lugs of the pressure plate, believing that insufficient clearance existed between the driving lugs and holes in the cover. This practice should not be followed, because clearance in excess of .005 in. divided between either side of the driving lug is unnecessary and undesirable since it may cause noise and roughness (unbalance).

Care should be taken when reinstalling the clutch cover assembly to make sure that the small dowel in the flywheel engages the hole in the cover. It is possible to bolt the cover in place without registering the dowel with the hole in the cover, but an out-of-balance assembly, a distorted cover and a poor operating clutch will result.

Windshield Wiper Fuse

Should the windshield wiper 14-amp fuse used on the 1941 Studebaker Commander and President cars burn out it may be caused by the windshield wiper blades freezing in position. It is suggested that when this occurs a 20-amp fuse be installed. The 20-amp fuse is longer, and requires a longer insulator. To make this replacement, use part No. 108932 Fuse and part No. 278976 Fuse insulator.

The windshield wiper fuse is located back of the instrument board inside a small metal capsule attached to the short wire from the fuse block to the windshield wiper switch.

High Pitched Whistle

A high-pitched whistle or siren type of noise which may be present in the 1941 DeSoto will be found to be caused by the radiator grille bars vibrating, according to information received from the DeSoto factory.

A quick check for this condition can be made by placing a piece of masking tape across the front and through the center of each grille, making sure the tape sticks to each individual bar. If this stops the whistle, fasten a coil spring (screen-door spring) across the grille bars on the inside. Springs should be about 8 in. long. Remove the upper radiator grille cover plate in order to fasten the springs on the inside of the grille.



X-RAY TELLS ALL!

USING THE ABOVE "X-RAY"

HOW MANY OF THESE RAMCO ENGINEERING PRINCIPLES CAN YOU EXPLAIN?

- Double Life Principle.
- Uniform Expansion Principle.
- Self-Regulating Oil Control Principle.
- Non-Collapsible Principle.
- Alternating Unit Pressure on Up-and-Down Stroke.

HOW DO THESE FEATURES LENGTHEN RING LIFE?

Jumbo Oil Slots • Full Fledged Oil Ring • Spiro-Seal Segment That Bridges the Gap • Lowest Unit Pressure of 7 Leading Brands • Inter

Slot Canals • Straight-Through Oil Slots—no ledges to Collect Carbon • Recessed Inner Ring, provides ample oil drainage • Beveled Oil Ring.

WHEN you know the answers to these questions . . . there'll be no question in your mind as to what rings you are going to install . . . no question either as to why Ramco 10-Up Rings can be guaranteed to control oil and blow-by for 10,000 Miles on a Warranty that includes both rings and labor. Write for full details on Ramco 10-Up or see your Ramco jobber. Address Ramsey Accessories Mfg. Corp., 3711 Forest Park Blvd., St. Louis, Mo.; in Canada: 144 Front St., W., Toronto, Ontario.

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RAMCO 10^{up}

PISTON RINGS & EXPANDERS



Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the
Car Manufacturers and Supersede All Others Previously Published

MAKE AND MODEL	Lowest priced 4-D. Sed. (Delvd.)	Wheelbase (In.)	Tire Size (In.)	No. of Cylinders, Bore and Stroke	ENGINE														CHASSIS				
					Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake Hp. at Specified R.P.M.	Compression Ratio (to-1)	Displacement Factor †	Cylinder Head Material	Camsshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Universal Joint	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension
Bantam.....65	443	75	4.00/15	4-2.26x3.12	8.2	50.14	22-3800	7.40	.....	CI	Own	Al	None	AC	Z	Mc	AL	AL	P-Ro	UP	1/2 Spi	5.25	Tr
Buick.....41-40A	1021	118	6.50/15	8-3 1/2 x4 1/2	30.6	248.0	115-3500	6.50	36.9	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S-S	1 1/2 Own	4.10	IC
Buick.....41-40B	1052	121	6.50/16	8-3 1/2 x4 1/2	30.6	248.0	115-3500	6.50	36.4	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S-S	1 1/2 Own	4.40	IC
Buick.....41-50	1185	121	6.50/16	8-3 1/2 x4 1/2	30.6	248.0	125-3800	7.00	33.6	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S-S	1 1/2 Own	4.40	IC
Buick.....41-60	1238	126	7.00/15	8-3 1/2 x4 1/2	37.8	320.2	165-3800	7.00	39.0	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S	1 1/2 Own	3.90	IC
Buick.....41-70	1364	126	7.00/15	8-3 1/2 x4 1/2	37.8	320.2	165-3800	7.00	39.1	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S	1 1/2 Own	3.90	IC
Buick.....41-90	2155	139	7.50/16	8-3 1/2 x4 1/2	37.8	320.2	165-3800	7.00	.....	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S	1 1/2 Own	4.18	IC
Cadillac V8.....61,62,63,60S	1445	126	7.00/15	8-3 1/2 x4 1/2	39.2	346.0	150-3400	7.25	.....	CI	LB	Al	None	AC	S-C	Wal	DR	DR	P-Long	Nb-Mec	1 1/2 Own	3.77	IC
Cadillac V8.....67, 75	2595	139-136	7.50/16	8-3 1/2 x4 1/2	39.2	346.0	150-3400	7.25	.....	CI	LB	Al	None	AC	S-C	Wal	DR	DR	P-Long	Nb-Mec	1 1/2 Own	4.27	IC
Chevrolet M.D.L. & Sp.D.L.	795	116	6.00/16	6-3 1/2 x3 3/4	29.4	216.5	90-3300	6.50	35.2	CI	Dia	CI	None	AC	Car	Var	DR	DR	P-Own	Nb-Mec	1 1/2 Own	4.11	IC
Chrysler.....C-28	1051	121 1/2	6.25/16	6-3 3/4 x4 1/2	27.3	241.5	112-3600	6.80	35.1	CI*	Mor	Al	Pur	AC	Car	.....	AL	Wil	P-B&B	rb	1 1/2	3.90	IC
Chrysler.....C-30N, C-30K	1278	127 1/2	7.00/15	8-3 1/2 x4 1/2	33.8	323.5	137-3400	6.80	41.5	CI*	M-W	Al	Pur	AC	Str	.....	AL	Wil	P-B&B	rb	1 1/2	3.91	IC
Chrysler.....C-33	2595	145 1/2	7.50/15	8-3 1/2 x4 1/2	33.8	323.5	140-3400	6.80	.....	Al	M-W	Al	Pur	AC	Str	.....	AL	Wil	P-B&B	rb	1 1/2	4.55	IC
Crosley.....CB-41	366	80	4.25/12	2-3x2 1/2	7.2	35.3	12-4000	5.60	.....	CI	Wau	CI	None	AC	Til	Own	AL	AL	P-Ro	Mp-S	1/2 Spi	5.14	C
De Soto-DeL. & Cust.-S-8	995	121 1/2	6.25/16	6-3 3/4 x4 1/2	27.3	228.1	105-3600	6.80	35.5	CI*	Mor	Al	Pur	AC	Car	.....	AL	Wil	P-B&B	rb	1 1/2	4.10	IC
Dodge-DeL. & Cust.-D-19	920	119 1/2	6.00/16	6-3 1/4 x4 1/2	25.3	217.8	91-3800	6.50	.....	CI	Mor	Al	Pur	AC	Str	.....	AL	AL	P-B&B	bt	1 1/2	4.30	IC
Ford-DeL. & Sup. DeL.	85	740 1/2	6.00/16	8-3.06x3.75	30.0	217.0	85-3800	6.15	.....	CI	Dia	CS	.....	Own	Own	Own	Own	Own	P-Long	Own	3/4 Own	3.78	Tr
Hudson-DeL. & Tr. 6.....10	811	116	(d)	6-3x4 1/2	21.6	175.0	92-4000	7.25	34.8	CI	Dia	Al	None	AC	Car	Old	AL	Na	P-Own	NB-Spi	1 1/2 Own	4.55	IC
Hud.-Sup. & Com. 6.....11, 12	952	121	(f)	6-3x5	21.6	212.0	102-4000	6.50	35.4	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	1 1/2 Own	4.11	IC
Hudson-Com'dore 8.....14	1035	121	6.25/16	8-3x4 1/2	28.8	254.0	128-4200	6.50	39.6	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	1 1/2 Own	4.11	IC
Hudson-Comm. Cus. 8.....17	1278	128	6.50/16	8-3x4 1/2	28.8	254.0	128-4200	6.50	.....	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	1 1/2 Own	4.11	IC
Lincoln-Zeph. & Cont. V-12	1450 1/2	125	7.00/16	12-2.875x3.75	39.6	292.0	120-3500	7.00	.....	CI	Dia	CS	.....	Own	Own	Own	Own	Own	P-Long	Own	3/4 Own	4.44	Tr
Lincoln-Custom.....V-12	2550 1/2	138	7.00/16	12-2.875x3.75	39.6	292.0	120-3500	7.00	.....	CI	Dia	CS	.....	Own	Own	Own	Own	Own	P-Long	Own	3/4 Own	4.44	Tr
Mercury.....95	960 1/2	118	6.50/16	8-3.187x3.75	32.5	239.0	95-3600	6.15	.....	CI	Dia	CS	.....	Own	Own	Own	Own	Own	P-Long	Own	3/4 Own	3.54	Tr
Nash-Amb. 600.....4140	780	112	5.50/16	6-3 1/2 x3 3/4	23.4	172.6	75-3600	6.87	33.4	CI	W-D	Als	None	AC	Car	Wal	DR	AL	P-B&B	m-Mec	1 1/2 Own	4.11	IC
Nash-Amb. 6.....4160	930	121	6.25/16	6-3 3/4 x4 1/2	27.3	234.8	105-3400	6.30	35.6	CI	W-D	Als	Pur	AC	Car	Wal	AL	AL	P-B&B	m-Mec	1 1/2 Own	4.10	IC
Nash-Amb. 8.....4180	1050	121	6.50/16	8-3 3/4 x4 1/2	31.2	260.8	115-3400	6.30	38.2	CI	W-D	Als	Pur	AC	Car	Wal	AL	AL	P-B&B	m-Mec	1 1/2 Own	4.10	IC
Oldsmobile.....Special 6	945	119	6.00/16	6-3 1/2 x4 1/2	29.4	238.0	100-3400	6.20	37.7	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1 1/2 Own	4.10	IC
Oldsmobile.....Dynamic 6	1010	125	6.50/16	6-3 1/2 x4 1/2	29.4	238.0	100-3400	6.20	37.2	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1 1/2 Own	4.30	IC
Oldsmobile.....Custom 6	1099	125	7.00/15	6-3 1/2 x4 1/2	29.4	238.0	100-3400	6.20	37.0	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1 1/2 Own	4.30	IC
Oldsmobile.....Special 8	987	119	6.00/16	6-3 1/2 x3 3/4	33.8	257.0	110-3600	6.30	38.4	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1 1/2 Own	4.10	IC
Oldsmobile.....Dynamic 8	1045	125	6.50/16	8-3 1/2 x3 3/4	33.8	257.0	110-3600	6.30	39.0	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1 1/2 Own	4.30	IC
Oldsmobile.....Custom 8	1135	125	7.00/15	8-3 1/2 x3 3/4	33.8	257.0	110-3600	6.30	39.0	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1 1/2 Own	4.30	IC
Packard-110.....1900	1056	122	6.50/15	6-3 1/2 x4 1/2	29.4	245.0	100-3600	6.39	.....	CI	Mor	Als	.....	AC	Str	.....	A-D	Wil	P-Long	UP	1 1/2 Own	4.30	IC
Packard-120.....1901	1261	127	7.00/15	8-3 1/2 x4 1/2	33.8	282.0	120-3600	6.41	40.6	CI	Mor	Als	.....	AC	Car	Wal	AL	AL	P-Long	rb-Mec	1 1/2 Own	4.09	IC
Packard-160.....1903, 4, 5	1750	127-38-48	7.00/16	8-3 1/2 x4 1/2	39.2	356.0	160-3600	6.45	43.8	CI	Mor	Als	Pur	AC	Str	.....	AL	AL	P-Long	rb-Mec	1 1/2 Own	(g)	IC
Packard-180.....1906, 7, 8	2587	127-38-48	7.00/16	8-3 1/2 x4 1/2	39.2	356.0	160-3600	6.45	43.8	CI	Mor	Als	Pur	AC	Str	.....	AL	AL	P-Long	rb-Mec	1 1/2 Own	(g)	IC
Packard.....1951	3725	127	7.00/15	8-3 1/2 x4 1/2	33.6	232.0	125-3600	6.85	.....	CI	Mor	Als	.....	AC	Car	.....	AL	Wil	P-Long	rb-Mec	1 1/2 Own	4.09	IC
Plymouth.....P-11	780	117	6.00/16	6-3 1/2 x4 1/2	23.4	201.3	87-3800	6.70	35.1	CI*	Mor	Al	Pur	AC	Car	.....	AL	AL	P-B&B	bt	1 1/2 Own	4.10	IC
Plymouth-Spec. DeL.P-12	840	117	6.00/16	6-3 1/2 x4 1/2	23.4	201.3	87-3800	6.70	36.1	CI*	Mor	Al	Pur	AC	Car	.....	AL	AL	P-B&B	bt	1 1/2 Own	4.30	IC
Pontiac-DeL. 6.....41-25	921	119	6.00/16	6-3 1/2 x4	30.4	239.2	90-3200	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1 1/2 Own	4.10	IC
Pontiac-Stream. 6.....41-26	980	122	6.50/16	6-3 1/2 x4	30.4	239.2	90-3200	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1 1/2 Own	4.30	IC
Pontiac-Custom 6.....41-24	1052	122	6.50/16	6-3 1/2 x4	30.4	239.2	90-3200	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1 1/2 Own	4.30	IC
Pontiac-DeL. 8.....41-27	946	119	6.00/16	8-3 1/2 x3 3/4	33.8	248.9	103-3500	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1 1/2 Own	4.10	IC
Pontiac-Stream. 8.....41-28	1005	122	6.50/16	8-3 1/2 x3 3/4	33.8	248.9	103-3500	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1 1/2 Own	4.30	IC
Pontiac-Custom 8.....41-29	1077	122	6.50/16	8-3 1/2 x3 3/4	33.8	248.9	103-3500	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1 1/2 Own	4.30	IC
Studebaker-Champ. 6.....3G	770	110	5.50/16	6-3x4	21.6	169.6	80-4000	6.50	39.2	CI	Dia	Al	None	AC	Car	Wal	AL	Wil	P-B&B	NB-Spi	1 1/2 Spi	4.56	IT
Studebaker-Com. 6.....11A	985	119	6.25/16	6-3 1/2 x4 1/2	26.3	228.2	94-3600	6.50	40.2	CI	Dia	Al	Fram	AC	Str	Wal	AL	Wil	P-Inl	NB-Spi	1 1/2 Spi	4.55	IT
Studebaker-Pres. 8.....7C	1115	124 1/2	7.00/16	8-3 1/2 x4 1/2	30.0	250.4	117-4000	6.50	39.0	CI	Dia	Al	.....	AC	Str	Wal	AL	Wil	P-Inl	NB-Spi	1 1/2 Spi	4.55	IT
Willys-American.....441	705	104	5.50/16	4-3 1/2 x4 1/2	15.6	134.2	63-3900	6.48	30.8	CI	LB	Al	None	AC	Car	Mc	AL	AL	P-Ai	m-UP	1 1/2 Own	4.44	1/2 E

ABBREVIATIONS:

1/2—Semi-floating
3/4—Three-quarter floating
1/2 E—Semi-elliptic
°—Aluminum optional
†—Exclusive of Federal taxes.
(d)—De Luxe, 6.00/16; Traveler, 5.50/16
(f)—Model 11—6.00/16; Model 12—6.25/16
(g)—Models 1903-6, 3.92; Models 1904-7, 4.09; Models 1905-8, 4.36

A-D—Electric Auto-Lite Co. and Delco-Remy Division
AC—AC Spark Plug Co.
Al—Aluminum
AL—Electric Auto-Lite Co.
Als—Aluminum with struts
At—Atwood
B&B—Borg & Beck Division
bt—Ball and trunnion type
C—Conventional
Car—Carter Carburetor Corp.
CC—Conventional coil
CI—Cast iron
CN—Chrome nickel
CS—Cast steel

Dia—Continental Diamond Fibre Co.
DR—Delco-Remy Division
Hay—Hayes Industries, Inc.
IC—Independent coil spring
Inl—Inland with Long disc
IT—Independent transverse
LB—Link Belt Co.
Long—Long Mfg. Div.
m—Metal with anti-friction bearings.
Mc—MacKenzie Muffler Co.
Mec—Mechanics Universal Joint Division
Mor—Morse Chain Co.

Mp—Metal with plain bearings
M-W—Morse or Whitney
Na—National Battery Co.
Nb—Needle bearing
Obi—Own clutch, Borg & Beck or Long disc
Old—Oldberg Mfg. Co.
P—Single plate clutch
Pur—Purrolator Products, Inc.
rb—Roller bearing
Ro—Rockford Drilling Machine Div.
S—Saginaw Steering Gear Div.
S-C—Stromberg and Carter
SM—Saginaw and Mechanics
Spi—Spicer Mfg. Corp.

S-S—Saginaw and Spicer
Str—Stromberg (Bendix Products Div.)
Til—Tillotson Mfg. Co.
Tr—Transverse
Un—United Air Cleaner Div.
UP—Universal Products Co.
Var—Various
Wal—Walker Mfg. Co.
Wau—Waukesha Motor Co.
W-D—Whitney and Diamond Chain Co.
Whit—Whitney Mfg. Co.
Wil—Willard Storage Battery Co.
Z—Zenith Carburetor Div.

Tune-Up Specifications

These Specifications Are Brought Up-to-Date Each Month by the
Car Manufacturers and Supersede All Others Previously Published

MAKE AND MODEL	Compression Pressure at Cranking Speed (Lbs.)	Spark Plugs Make and Type	RINGS		VALVES							IGNITION						Rods Removed From Capacity Crankcase (Qts.) Dry	FRONT AXLE						
			No. and Width Compression	No. and Width Oil	Inlet Seat Angle (Degrees)	Exhaust Seat Angle (Degrees)	Stem Diameter (Ins.)	Operating Tappet Clearance		Inlet Tappet Clearance for Valve Timing	Inlet Valve Opens Before or After T. C.		Breaker Points Gap (Ins.)	Cam Angles (Degrees)	Spark Plug Gap (Ins.)	Spark Occurs °TC	Timing		Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	King Pin Inclination (Degrees)			
								Inlet	Exhaust		No. of Degrees	No. of Flywheel Teeth					No. of Flyw. Teeth Spark Occurs TC						Timing Marks Located		
Bantam.....	65	135	Ch-H10	2-3/8 1-7/8	45	45	.279	.011H	.012H	.011	19B	4 1/2 B	.022	46	.025	4B	1B	None	A	3	5 1/2	15	1°-15'	1/8	1 1/2
Buick.....	41-40A	AC-106	2-3/8 2-1/8	45	45	.372	.015H	.015H	++	13B	5 1/2 B	.015	31	.025	2B	1B	None	A	8	13	3/8 ± 3/8	N1 ± 1	0-1/8	3 1/2	
Buick.....	41-40B	AC-103	2-3/8 2-1/8	45	45	.372	.015H	.015H	++	13B	5 1/2 B	.015	31	.025	4B	1B	None	A	8	13	3/8 ± 3/8	N1 ± 1	0-1/8	3 1/2	
Buick.....	41-50	148x	AC-103	2-3/8 2-1/8	45	45	.372	.015H	.015H	++	14B	6B	.015	31	.025	6B	2 1/2 B	None	A	10	16 3/4	3/8 ± 3/8	N1 ± 1	0-1/8	3 1/2
Buick.....	41-60	151x	AC-103	2-3/8 2-1/8	45	45	.372	.015H	.015H	++	14B	6B	.015	31	.025	6B	2 1/2 B	None	A	10	16 3/4	3/8 ± 3/8	N1 ± 1	0-1/8	3 1/2
Buick.....	41-70	151x	AC-103	2-3/8 2-1/8	45	45	.372	.015H	.015H	++	14B	6B	.015	31	.025	6B	2 1/2 B	None	A	10	16 3/4	3/8 ± 3/8	N1 ± 1	0-1/8	3 1/2
Buick.....	41-90	151x	AC-103	2-3/8 2-1/8	45	45	.372	.015H	.015H	++	14B	6B	.015	31	.025	6B	2 1/2 B	None	A	10	16 3/4	3/8 ± 3/8	N1 ± 1	0-1/8	3 1/2
Cadillac V8.....	61,62,63,60S	182x	AC-104	2-(c) 2-5/8	45	45	.341	AA	AA	AA	TC	TC	.0125	31	.025	5B	2B	TD	A	7	25	-12°-N22	1/8 ± 1/8	3/8 ± 3/8	5°-51'
Cadillac V8.....	67, 75	182x	AC-104	2-(c) 2-5/8	45	45	.341	AA	AA	AA	TC	TC	.0125	31	.025	5B	2B	TD	A	7	25	-12°-N22	1/8 ± 1/8	3/8 ± 3/8	5°-51'
Chevrolet Sp.DL & M.DL.....		AC-104	2-3/8 1-3/8	30	30	.340	.006H	.013H	.006	3B	1B	.018	39	.040	5B	2B	Fly	A	5 1/2	14	0-1 1/2	N1 1/4 ± 1/2	0-1/8	4°-45'	
Chrysler.....	C-23	145x	AL-A7	2-1/8 2-5/8	45	45	.340	.008H	.010H	.014	12B	4 1/2 B	.020	34 1/2	.025	TC	TC	VD	A	5	18	N1 ± 1	0-1 1/4	0-1/8	4 1/2-6
Chrysler.....	C-30N, C-30K	155x	AL-A7	2-1/8 2-5/8	45	45	.340	.008H	.010H	.011	6B	2 1/2 B	.018	27-30 1/2	.025	TC	TC	VD	A	6	24	N1 ± 1	0-1 1/4	0-1/8	4 1/2-6
Chrysler.....	C-33	155x	AL-AL7	2-1/8 2-5/8	45	45	.340	.008H	.010H	.011	6B	2 1/2 B	.018	27-30 1/2	.025	3B	1B	VD	A	6	24	N1 ± 1	0-1 1/4	0-1/8	4 1/2-6
Crosley.....	CB-41	80	AL-A5	2-3/8 1-3/8	45	45	.311	.006C	.008C		20B	5B	.020	46	.025	TC	TC	Fly	A	3		6 1/2-11	2	1/8	6 1/2
De Soto-DeL. & Cust. S-8.....	150x	AL-A7	2-3/8 2-3/8	45	45	.340	.008H	.010H	.014	12B	2 1/2 B	.020	34 1/2	.025	TC	TC	VD	A	5	18	N1 ± 1	0-1 1/4	0-1/8	4 1/2-6	
Dodge-DeL. & Cust. D-19.....	142x	AL-A7	2-(c) 2-3/8	45	45	.340	.008H	.010H	.014	3B	3 1/2 B	.020	34 1/2	.025	TC	TC	VD	A	5	15	N1 ± 1	0-1 1/4	0-1/8	4 1/2-6	
Ford-DeL. & Sup. DeL. 85.....	100	Ch-H10	2-(b) 1-(f)	45	45	(k)	.011C	.011C		TC	TC	.015		.025	4B	1 1/2 B	Dist	A	5	23 3/4	4 1/2-9	1/4-1	1/8	8	
Hudson-DeL. & Tr. 6.....	10	125x	Ch-J9	2-3/8 2-(d)	45	45	.341	.006H	.008H		10 3/8 B	4B	.020	34	.032	1 1/2 B	2 1/2 B	Fly	A	6	13	0-1 1/4	1/4 ± 1/4	3/8 ± 3/8	3°-36'
Hud.-Sup. & Com. 6.....	11, 12	120x	Ch-J9	2-3/8 2-(d)	45	45	.341	.006H	.008H		10 3/8 B	4B	.020	34	.032	1 1/2 B	2 1/2 B	Fly	A	6	13	0-1 1/4	1/4 ± 1/4	3/8 ± 3/8	3°-36'
Hudson-Com'dore 8.....	14	115x	Ch-J9	2-3/8 2-(d)	45	45	.343	.006H	.008H		10 3/8 B	4B	.017	30 1/2	.032	TC	1B	Fly	A	9	18	0-1 1/4	1/4 ± 1/4	3/8 ± 3/8	3°-36'
Hudson-Comm. Cus. 8.....	17	119x	Ch-J9	2-3/8 2-(d)	45	45	.343	.006H	.008H		10 3/8 B	4B	.017	30 1/2	.032	TC	1B	Fly	A	9	18	0-1 1/4	1/4 ± 1/4	3/8 ± 3/8	3°-36'
Lincoln-Zeph. & Cont. V-12.....		Ch-H10	2-(g) 1-(h)	45	45	.311	.013C	.013C		10 3/8 B	3 1/2 B	.015		.029	4B	1 1/2 B	Dist	A	5	22	3-5	1/4 ± 3/4	1/8	3 3/4-4 1/4	
Lincoln-Custom.....	V-12	Ch-H10	2-(g) 1-(h)	45	45	.311	.013C	.013C		10 3/8 B	3 1/2 B	.015		.029	4B	1 1/2 B	Dist	A	5	22	3-5	1/4 ± 3/4	1/8	3 3/4-4 1/4	
Mercury.....	95	100	Ch-H10	2-(b) 1-(f)	45	45	(k)	.011C	.011C		TC	TC	.015		.025	4B	1 1/2 B	Dist	A	5	23 3/4	4 1/2-9	1/4-1	1/8	8
Nash-Amb. 600.....	4140	120	AL-AN7	2-3/8 1-3/8	45	45	.341	.015	.015	.01	6B	2B	.018	35	.025	TC	TC	VD	A	5	14	0	0-1/8	0-1/8	5 1/2
Nash-Amb. 6.....	4160	125	AC-	2-3/8 2-1/8	45	45	.372	.015	.015	.015	24B	6B	.020	35	.023		VD	A	6	17	0-N 1/2	1/4 ± 1/4	3/8 ± 3/8	4 1/2	
Nash-Amb. 8.....	4180	110	AC-	2-3/8 2-(o)	45	45	.372	.015	.015	.015	19B	6B	.020	28	.023	9B	2 1/2 B	VD	A	7	16	0-N 1/2	1/4 ± 1/4	3/8 ± 3/8	4 1/2
Oldsmobile.....	Special 6	115	AC-44	2-3/8 2-1/8	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0-N 3/4	N1 1/4 ± 3/4	1/8 ± 1/8	4°51' 1/2
Oldsmobile.....	Dynamic 6	115	AC-44	2-3/8 2-1/8	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0-N 3/4	N1 1/4 ± 3/4	1/8 ± 1/8	4°51' 1/2
Oldsmobile.....	Custom 6	115	AC-44	2-3/8 2-1/8	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0-N 3/4	N1 1/4 ± 3/4	1/8 ± 1/8	4°51' 1/2
Oldsmobile.....	Special 8	107	AC-44	2-3/8 2-1/8	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	3/4 B	Fly	A	6	22	0-N 3/4	N1 1/4 ± 3/4	1/8 ± 1/8	4°51' 1/2
Oldsmobile.....	Dynamic 8	107	AC-44	2-3/8 2-1/8	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	3/4 B	Fly	A	6	22	0-N 3/4	N1 1/4 ± 3/4	1/8 ± 1/8	4°51' 1/2
Oldsmobile.....	Custom 8	107	AC-44	2-3/8 2-1/8	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	3/4 B	Fly	A	6	22	0-N 3/4	N1 1/4 ± 3/4	1/8 ± 1/8	4°51' 1/2
Packard-110.....	1900	(a)	2-(m) 1-3/8	30	45	.339	.007H	.010H	.012	1B	1 1/2 B	.020	35	.028	6B	2 1/2 B	VD	A	5	15	1/2 ± 1/2	1/2 ± 3/4-0	0-1/8-0	2 1/2	
Packard-120.....	1901	(a)	2-(n) 1-3/8	30	45	.339	.007H	.010H	.012	1B	1 1/2 B	.015	27	.028	7B	2 1/2 B	VD	A	6	17	1/2 ± 1/2	1/2 ± 3/4-0	0-1/8-0	2 1/2	
Packard-160.....	1903, 4, 5	(a)	2-(m) 1-3/8	30	45	.339	aa	aa	aa	4B	1 1/2 B	.015	27	.028	5B	2B	VD	A	7	20	N 3/4 ± 1/2	1/2 ± 3/4-0	0-1/8-0	2 1/2	
Packard-180.....	1906, 7, 8	(a)	2-(m) 1-3/8	30	45	.339	aa	aa	aa	4B	1 1/2 B	.015	27	.028	5B	2B	VD	A	7	20	N 3/4 ± 1/2	1/2 ± 3/4-0	0-1/8-0	2 1/2	
Packard.....	1951	(a)	2-(n) 1-3/8	33	45	.339	.007H	.010H	.012	1B	1 1/2 B	.015		.028	5B	23		A	6	7	N1 ± 1/2	1/4 ± 1/2	0-1/8-1	5-35'	
Plymouth.....	P-11	AL-A7	2-(c) 2-5/8	45	45	.340	.008H	.010H	.014	9B	3 1/2 B	.020	34 1/2	.025	TC	TC	VD	A	5	14	N1 ± 1	0-3/4	0-1/8	4 1/2-6	
Plymouth-Spec. DeL.P-12.....	AL-A7	2-(c) 2-5/8	45	45	.340	.008H	.010H	.014	9B	3 1/2 B	.020	34 1/2	.025	TC	TC	VD	A	5	14	N1 ± 1	0-3/4	0-1/8	4 1/2-6		
Pontiac-DeL. 6.....	41-25	155x	AC-45	2-3/8 1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1 1/2 B	Fly	A	6	18	N1 1/2-N1	0	0-1/8	4 1/2
Pontiac-Stream. 6.....	41-26	155x	AC-45	2-3/8 1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1 1/2 B	Fly	A	6	18	N1 1/2-N1	0	0-1/8	4 1/2
Pontiac-Custom 6.....	41-24	155x	AC-45	2-3/8 1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1 1/2 B	Fly	A	6	18	N1 1/2-N1	0	0-1/8	4 1/2
Pontiac-DeL. 8.....	41-27	155x	AC-45	2-3/8 1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1 1/2 B	Fly	A	6	19 1/2	N1 1/2-N1	0	0-1/8	4 1/2
Pontiac-Stream. 8.....	41-28	155x	AC-45	2-3/8 1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1 1/2 B	Fly	A	6	19 1/2	N1 1/2-N1	0	0-1/8	4 1/2
Pontiac-Custom 8.....	41-29	155x	AC-45	2-3/8 1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1 1/2 B	Fly	A	6	19 1/2	N1 1/2-N1	0	0-1/8	4 1/2
Studebaker-Champ. 6.....	3G	105	Ch-J8	2-(c) 1-5/8	45	45	.312	.016C	.016C	.020	15B	5B	.020	35	.025	1B	2B	Fly	A	5	10				

ABBREVIATIONS:

(x)—At 1000
(f)—AC-104; Champion Y-4
(b)—.0915 to .0920 in.
(c)—3/8; 1/8
(d)—1/2; 1 1/8

(e)—1 1/8; 1 1/2
(f)—.1535 in. to .1540 in.
(g)—.0930 in. to .0935 in.
(h)—.1845 in. to .1850 in.
(k)—.3095 in. to .3115 in.
(m)—.0932; 1-.1237

(n)—1-.0925-.0935; 1-.1235-.1240
aa—Automatic adjustment
A—Above
AA—Automatic Adjuster
AC—AC Spark Plug Co.

Motor Car Price, Weight and Body Table

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford, Lincoln-Zephyr, Mercury and Willys. Optional equipment, state or local taxes, transportation charges and finance charges are extra.

BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight
BANTAM			CADILLAC			DE SOTO			HUDSON			OLDSMOBILE			PONTIAC		
Mast. Coupe, 2p.	449	1271	(Continued)			(Continued)			(Continued)			(Continued)			DeLuxe Six	828	3145
Mast. Road., 2p.	449	1211	Series 75			Brougham, 6p.	1020	3264	Big Boy—18			Dynamic Eight			Coupe.....	864	3180
Pickup Truck.....	475	1256	Bus. Sedan, 9p.	2895	4738	Sedan, 4d., 6p.	1045	3269	Carroll, 8p.	3165		Club Sedan, 6p.	989	3420	Sedan Coupe....	874	3190
Panel Truck.....	489	1331	Tour. Sedan, 5p.	2995	4750	Town Sedan, 6p.	1095	3329	Sedan, 8p.	3155		Sedan, 4d., 6p.	1045	3500	Sedan, 2d.....	921	3235
Conv. Coupe, 2p.	525		Bus. Imperial, 5p.	3050	4767	Club Coupe, 5p.	1035	3239				Custom Eight			Conv. Sed. Cpe..	1023	3335
Conv. Sedan, 4p.	549	1296	Tour. Sedan, 7p.	3140	4800	Sedan, 7p.	1295		LINCOLN			Club Coupe, 3-6p.	1079	3430			
Sta. Wagon, 4p.	575	1411	Tr. Sed. Div., 5p.	3150	4810	Limousine, 7p.	1370		ZEPHYR			Sedan, 4d., 6p.	1135	3500	Streamliner		
			Formal Sedan, 5p.	3295	4860				Standard			Conv. Cpe., 3-6p.	1227	3620	Six		
				3920	4915	DODGE			Coupe, 3p.	1390	3560	Conv. Phae., 6p.	1575	3790	Sedan Coupe....	923	3305
			CHEVROLET			DeLuxe	825	3034	Sedan, 6p.	1450	3710				Sedan, 4d.....	980	3365
			Master DeL.			Coupe.....	880	3109	Club Coupe, 6p.	1450	3640				Sup. Sed. Cpe..	969	3320
			Bus. Coupe.....	712	3020	Sedan, 2d., 6p.	920	3149	Conv. Coupe, 6p.	1750	3840	PACKARD			Sup. Sed., 4d..	1026	3400
			Coupe, 5p.	743	3025				Custom			One Ten			Custom Six		
			Town Sedan, 5p.	754	3050	Custom			Coupe.....	1465	3560	Bus. Coupe, 2p.	907	3150	Sedan Coupe....	995	3260
			Sport Sedan, 5p.	795	3090	Brougham, 2d., 6p.	925	3169	Sedan.....	1545	3710	Tr. Sed., 2d., 5p.	1024	3245	Sedan, 4d.....	1052	3355
			Special DeL.			Club Coupe, 6p.	960	3154	LINCOLN			D. Cb. Cpe., 2-4p.	1038	3205			
			Bus. Coupe.....	769	3040	Sedan, 4d., 6p.	965	3194	CONTINENT			Tr. Sed., 4d., 5p.	1056	3250	DeL. Eight		
			Coupe, 5p.	800	3050	Town Sedan, 6p.	995	3199	Cabriolet, 6p.	2700	3860	D. T. Sed., 2d., 5p.	1084	3270	Coupe.....	853	3220
			Town Sedan, 5p.	810	3095	Sedan, 7p.	1175	3579	Coupe, 6p.	2650	3890	D. T. Sed., 4d., 5p.	1116	3270	Sedan Coupe....	889	3250
			Sport Sedan, 5p.	851	3125	Limousine, 7p.	1250	3669				Conv. Cpe., 2-4p.	1175	3310	Sedan, 2d.....	899	3250
			Cabriolet, 5p.	949	3285	Conv. Coupe.	1125	3384	LINCOLN			D. C. Cpe., 2-4p.	1209	3315	Sedan, 4d.....	946	3285
			Stat. Wagon, 8p.	995		FORD			CUSTOM			Stat. Wag., 8p.	1231	3460	Conv. Sed. Cpe.	1048	3390
						Special			Sedan, 8p.	2550	4250	D. Sta. Wag., 8p.	1306	3470			
			CHRYSLER *			Bus. Coupe.....	665	2878	Limousine, 8p.	2675	4270	One Twenty			Bus. Cpe., 2p.	1112	3385
			Royal			Tudor Sedan	700	2983				Club Cpe., 2-4p.	1205	3430	Club Cpe., 2-4p.	1205	3430
			Coupe, 3p.	945	3170	Fordor Sedan	740	3033	MERCURY			Tr. Sed., 2d., 5p.	1230	3504	Tr. Sed., 4d., 5p.	1261	3510
			Brougham, 6p.	1021	3270	DeLuxe—85			Coupe, w.f.s.	885	3008	Conv. Cpe., 2-4p.	1377	3585	Sta. Wagon, 8p.	1436	3720
			Sedan, 4d., 6p.	1051	3300	Coupe, f.s.	695	2953	Coupe, f.s.	910	3049	D. Sta. Wag., 8p.	1511	3730	Conv. Sedan, 5p.	1723	3725
			Town Sedan, 6p.	1111	3320	Tudor Sedan	735	3095	Sedan, 2d.	920	3184	Super Eight					
			Club Coupe, 5p.	1041	3260	Fordor Sedan	775	3121	Town Sedan	960	3221	One Sixty—			Bus. Coupe, 2p.	1594	3875
			Sedan, 7p.	1325	3650	Station Wagon.	920	3412	Sedan Coupe.	950	3118	1903			Club Coupe, 2-4p.	1709	3800
			Limousine, 7p.	1400		Super			Club, Conv.	1070	3222	1905			Tr. Sed., 4d., 5p.	1750	3865
			Windsor			DeLuxe—85			Station Wagon.	1110	3468	1906			Conve. Cpe., 2-4p.	1892	3965
			Coupe, 3p.	998	3170	Coupe, w.f.s.	740	2969	NASH			1907			D. C. Cpe., 2-4p.	2067	3985
			Sedan, 2d., 6p.	1075	3270	Coupe, f.s.	770	3001	Ambassador			1908			Conv. Sedan, 5p.	2180	4140
			Sedan, 4d., 6p.	1125	3300	Tudor Sedan	780	3110	Special 600			1904			D. Conv. Sed., 6p.	2405	4160
			Club Coupe, 5p.	1096	3260	Fordor Sedan	820	3146	Business Coupe.	731		1905					
			Town Sedan, 6p.	1175	3315	Sedan Coupe.	810	3052	Sedan, 4d.	710		1906			Tour. Sedan, 7p.	2161	4495
			Conv. Coupe.	1275	3470	Conv. Club Cpe.	905	3187	Sedan, 2d.	745		1907			Limousine.....	2289	4570
			Limousine, 7p.	1470		Station Wagon.	970	3419	DeLuxe 600			1908					
			Saratoga			HUDSON			Business Coupe.	783		1909			DeLuxe-Tone		
			C-30-N			Traveler—10			Sedan, 4d.	710		1910			Coupe.....	755	2380
			Coupe, 3p.	1195	3600	Coupe, 3p.	713	2790	Sedan, 2d.	810		1911			Coupe, 5p.	790	2440
			Brougham, 6p.	1248	3715	Sedan, 2d., 6p.	783	2850	Sedan, 4d.	810	2630	1912			Club Sedan.	760	2430
			Sedan, 4d., 6p.	1278	3755	Club Coupe, 6p.	806	2840	Sedan, 4d.	860	2655	1913			Cruis. Sedan....	800	2460
			Town Sedan, 6p.	1328	3750	Sedan, 4d., 6p.	811	2900	Ambassador 6			1914					
			Club Coupe, 5p.	1268	3685	DeLuxe—10			Sedan, 2d.	923	3180	1915			DeLuxe-Tone		
			New Yorker,			Coupe, 3p.	821	2840	Business Coupe.	810		1916			Coupe.....	755	2380
			C-30-K			Sedan, 2d., 6p.	842	2900	Sedan, 4d.	810	2630	1917			Coupe, 5p.	790	2440
			Coupe, 3p.	1275	3635	Club Coupe, 6p.	868	2895	Sedan, 4d.	860	2655	1918			Club Sedan.	760	2430
			Brougham, 6p.	1325	3745	Sedan, 4d., 6p.	876	2950	Ambassador 8			1919			Cruis. Sedan....	835	2475
			Sedan, 4d., 6p.	1345	3775	Super Six—11			Sedan, 2d.	777		1920			Commander 6		
			Club Coupe, 5p.	1335	3690	Coupe, 3p.	901	2935	Sedan, 4d.	880	2895	1921			Custom		
			Town Sedan.	1375	3785	Sedan, 2d., 6p.	901	2935	Sedan, 4d.	880	2895	1922			Cruis. Sedan....	985	3135
			Conv. Coupe.	1495	3845	Club Coupe, 6p.	921	3000	Sedan, 4d.	880	2895	1923			Land Cruiser....	1030	3160
			Spec. Twn. Sed.	1745	3900	Convertible, 6p.	956	2980	Sedan, 4d.	880	2895	1924			Sedan Coupe....	965	
			Crown Imp.			Super Six—11			Sedan, 4d.	880	2895	1925			DeLuxe-Tone		
			C-33			Coupe, 3p.	901	2935	Sedan, 4d.	880	2895	1926			Cruis. Sedan....	1050	3155
			Sedan.....	2595	4435	Sedan, 2d., 6p.	921	3000	Sedan, 4d.	880	2895	1927			Land Cruiser....	1095	3180
			Sedan, 8p.	2695	4495	Club Coupe, 6p.	956	2980	Sedan, 4d.	880	2895	1928			Skyway		
			Limousine.....	2795	4560	Sedan, 4d., 6p.	952	3050	Sedan, 4d.	880	2895	1929			Cruis. Sedan....	1075	
			CROSLLEY			Convertible, 6p.	1175	3125	Sedan, 4d.	880	2895	1930			Land Cruiser....	1105	
			Coupe, 2p.	315	950	Commodore			Sedan, 4d.	880	2895	1931			Sedan Coupe....	1055	
			Std. Sedan, 4p.	366	975	Six—12			Sedan, 4d.	880	2895	1932			President 8		
			DeL. Sedan, 4p.	376	975	Coupe, 3p.	981	3000	Sedan, 4d.	880	2895	1933			Custom		
			Pkw. Delivery.	390	1030	Sedan, 2d., 6p.	1012	3050	Sedan, 4d.	880	2895	1934			Cruis. Sedan....	1115	3390
			Pick. Delivery.	400	1100	Club Coupe, 6p.	1043	3045	Sedan, 4d.	880	2895	1935			Land Cruiser....	1160	3420
			Cov. Wag., 2p.	402	1075	Sedan, 4d., 6p.	1040	3100	Sedan, 4d.	880	2895	1936			DeLuxe-Tone		
			Cov. Wag., 4p.	417	1100	Convertible.....	1247	3160	Sedan, 4d.	880	2895	1937			Cruis. Sedan....	1180	3405
			Panel Delivery.	451	1100	Commodore			Sedan, 4d.	880	2895	1938			Land Cruiser....	1225	3435
			Sta. Wag., 2p.	454	1135	8—14			Sedan, 4d.	880	2895	1939			Skyway		
			Sta. Wag., 4p.	470	1160	Coupe, 3p.	1024	3135	Sedan, 4d.	880	2895	1940			Cruis. Sedan....	1205	
			DE SOTO			Sedan, 2d., 6p.	1049	3210	Sedan, 4d.	880	2895	1941			Land Cruiser....	1255	
			DeLuxe			Club Coupe, 6p.	1086	3210	Sedan, 4d.	880	2895	1942			Sedan Coupe....	1185	
			Coupe, 3p.	898	3134	Convertible, 6p.	1297	3350	Dynamic Six			1943					
			Sedan, 2d., 3p.	965	3224	Commodore			Sedan, 4d., 6p.	954	3325	1944			Special DeL.		
			Sedan, 4d., 6p.	995	3254	Cust. 8—15			Sedan, 4d., 6p.	1010	3390	1945			Coupe, 2p.	760	2859
			Sedan, 7p.	1255	3289	Coupe, 3p.	1110	3185	Club Coupe, 3-6p.	1043	3320	1946			Coupe, 2-4p.	805	2934
			Club Coupe, 5p.	985	3219	Club Coupe, 6p.	1173	3235	Conv. Cpe., 3-6p.	1191	3525	1947			Sedan, 2d., 5p.	810	2934
			Custom			Commodore			Special Eight			1948			Sedan, 4d., 5p.	840	2959
			Coupe, 3p.	945	3144	Cust. 8—17			Club Coupe, 3-6p.	935	3300	1949			Conv. Cpe., 2-4p.	970	3166
			C. Cb. Cpe., 5p.	1195	3494	Sedan, 4d., 6p.	1278	3400	Sedan, 4d., 6p.	987	3360	1950			Sedan, 7p.	1045	3379
						Sedan, 4d., 6p.		3440	Conv. Cpe., 3-6p.	1089	3455	1951			Limousine, 7p.	1120	
												1952			Station Wagon.	995	3194

*—Shipping weights revised to car without running boards.

36 Races Are Scheduled

by AAA Contest Board

Including the International Grand Prix at Indianapolis, May 30, the schedule just released by the AAA Contest Board lists 36 racing events to be run before July 15. The opening races are scheduled at the Williams Grove, Pa., Speedway, and the Jungle Park, Ind., Speedway, May 4. The schedule:

Date	Place
May 4	Williams Grove (Pa.) Speedway
May 4	Jungle Park (Ind.) Speedway
May 11	Thompson (Conn.) Speedway
May 11	Dayton (Ohio) Speedway
May 11	Langhorne (Pa.) Speedway
May 18	Williams Grove (Pa.) Speedway
May 18	Fort Wayne (Ind.) Speedway
May 18	Langhorne (Pa.) Speedway
May 25	Thompson (Conn.) Speedway
May 25	Winchester (Ind.) Speedway
May 25	Langhorne (Pa.) Speedway
May 30	Altamont (N. Y.) Fairgrounds
May 30	Altoona (Pa.) Speedway
May 30	Indianapolis Motor Speedway
May 30	Akron (N. Y.) Speedway
June 1	Williams Grove (Pa.) Speedway
June 1	Fort Wayne (Ind.) Speedway
June 1	Langhorne (Pa.) Speedway
June 8	Thompson (Conn.) Speedway
June 8	Milwaukee (Wis.) Fairgrounds
June 8	Langhorne (Pa.) Speedway
June 15	Williams Grove (Pa.) Speedway
June 15	Dayton (Ohio) Speedway
June 15	Langhorne (Pa.) Speedway
June 22	Thompson (Conn.) Speedway
June 22	Jungle Park (Ind.) Speedway
June 22	Langhorne (Pa.) Speedway
June 29	Williams Grove (Pa.) Speedway
June 29	Langhorne (Pa.) Speedway
June 29	Winchester (Ind.) Speedway
July 4	Akron (N. Y.) Speedway
July 6	Langhorne (Pa.) Speedway
July 6	Thompson (Conn.) Speedway
July 13	Williams Grove (Pa.) Speedway
July 13	Langhorne (Pa.) Speedway
July 13	Dayton (Ohio) Speedway

Dyke's 19th Edition

The 19th Edition of Dyke's Automobile and Gasoline Engine Encyclopedia has just been issued. In addition to the standard information covering the principles of construction and operation, troubles, tests, adjustments and general repairing of automobiles and gasoline engines, the new edition contains complete and fully

illustrated instruction dealing with the fundamentals of aircraft engines. It includes such subjects as magnetos, carburetors, fuel injectors, superchargers, propellers, principle of flight, civil air regulations, as well as specifications of all American-made aircraft engines. There are also sections devoted to automotive Diesel engines, fluid drive, automatic transmissions, buses, trucks and tractors.

Dyke's Automobile and Gasoline Encyclopedia is published by The Goodheart-Willcox Co., Inc., 2009 South Michigan Ave., Chicago, Ill., and is priced at \$6.00.


2,302 Mile Sheet of Glass

A record unparalleled in the history of glass manufacture was reached March 30 by the Ford Motor Co. glass plant. At midnight that day the huge 100-ton melting furnace at the Rouge had been pouring a 51-inch-wide sheet of glass without interruption for two years and a day. The record run started on March 29, 1939, making a total of 731 days in a row that the white-hot ribbon of glass has been emerging from the big "tank" without a halt.

If laid out in a straight line, the sheet would be 2302 miles long.

Exclusive!

"THESE BABIES STOP
OIL TROUBLE RIGHT
AT THE SOURCE!"



McQUAY-NORRIS BEARINGS

ARE COMPLETELY BROACHED NOT BORED!

THE COMPLETE BEARING LINE WITH
COMPREHENSIVE UNDERSIZE SERVICE

Exclusive!

IT TAKES 13 DIFFERENT TYPES AND KINDS OF RINGS TO MAKE

Engineered PISTON RING SETS

LEGALLY SPEAKING

A lawyer's interpretation of Federal and local court decisions of interest to repairmen, presented each month

by C. R. ROSENBERG, JR.

Repudiation of Contract

WHERE a party to a contract defaults by failing to perform as agreed, may the repairman on the other end of the contract repudiate the contract in its entirety?

"A party cannot affirm a contract in part and repudiate it in part," said the Supreme Court of Montana recently, "unless the two parts are so severable from each other as to form two independent contracts."

So if all parts of a contract are so intertwined that all are mutually dependent on the others, the repudiation or rescission must be of the whole contract. That's simply because it just wouldn't work out any other way. But when a contract can be separated or divided into two or more parts or transactions, each so independent of the others that it might stand as a contract in itself, one or more parts may be rescinded for good legal cause and the other parts of the contract remain in good legal standing and enforceable. Might be a good "out" in a tough spot. Better have a lawyer do the carving, though.

Debtors' Exemptions

FOR credit and collection purposes, a debtor's assets equal what he has above the exemption allowed by the law of his State, and if there's one thing the courts protect to the last ditch it's debtors' exemptions.

"The exemption statute was adopt-

ed as a humane policy to prevent families from becoming destitute as the result of misfortune through common debts which generally are unforeseen," remarked the Supreme Court of New Mexico recently. "A like purpose prompts this character of legislation everywhere."

The courts simply will not allow a debtor's exempted goods to be sold to pay his debts. His exemption is sacred in the law.

Fraud by Mistake?

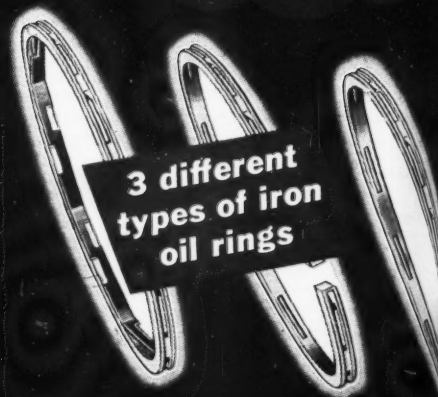
FRAUD is ordinarily based upon some intentional misrepresentation on which the other party acts to his sorrow. A Federal court recently pointed out that there is such a thing as fraud by mistake.

"Fraud," explains the court, "includes the mistaken statements of material facts which induce action by the other party, where the truth of such facts is within the special means of knowledge of the one making the statements. It is not necessary, to constitute a fraud, that a man who makes a false statement should know precisely that it is false. If he made it recklessly or without reasonable ground for believing it to be true, and he made it deliberately and in such a way as to give the person to whom it is made reasonable ground for supposing it was meant to be acted upon and has been acted upon by him accordingly, he may be guilty of fraud."

Safest rule is not to make any "representations" in a proposition unless



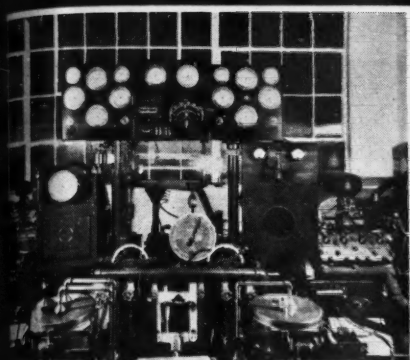
4 different
types of steel
oil rings



3 different
types of iron
oil rings



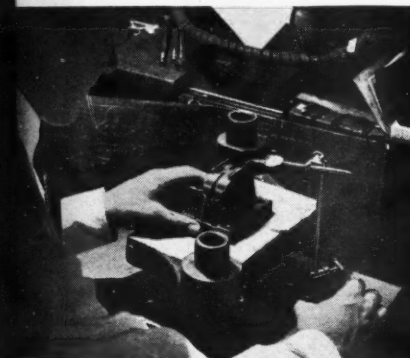
McQUAY-NORRIS



At piston ring headquarters,
Engineering is the



vital principle of operation
from start to finish...



not just a word used to adorn
a package.

and until the facts have been carefully checked. A repairman who makes a statement which he thinks is true but which he has not checked on, may find himself involved in a charge of fraud if it turns out to be false. Fraud by mistake may be just as uncomfortable as fraud by intent.

Saving Receipts

THE importance of saving cancelled checks and other receipts for money paid is emphasized by a recent Federal court mention of the "well known rule that he who claims he has made payment has the burden of proving it."

Usually, a receipt or cancelled check is the only way of proving payment. Repairmen should save receipts and cancelled checks until there is no longer any danger of being sued for the item which has been paid. That danger exists until the item is "out-lawed"—meaning that the time for bringing suit has passed. Each State has such a time limit set forth in its particular statute of limitations.

Complain Promptly!

A REPAIRMAN who has a complaint about goods or service he is buying should make his complaint promptly if he wants it to be recognized in any litigation that may arise between him and the other party.

In a recent District of Columbia case suit was brought for the unpaid balance for certain goods. The buyer, in turn, put in a claim for the damage he said he suffered by reason of the long delay in delivery of certain items. But it appeared that the buyer had not made any complaint or "counterclaim" on account of the delay during the actual period of delay and on the contrary promised payment in full.

"At no time during the eighteen months' correspondence," said the court, "did the buyer intimate the existence of any counterclaim for damage for delay in receipt of the goods. We are of the opinion that the absence of any protest for a period of almost two years, coupled with two written promises in the interim to pay in full, and a substantial payment expressly stated to be 'on our account,' are sufficient to show a waiver as a matter of law."

That "waiver" means that because he failed to make prompt complaint he gave up any right he might have had to obtain damages by reason of the delay.

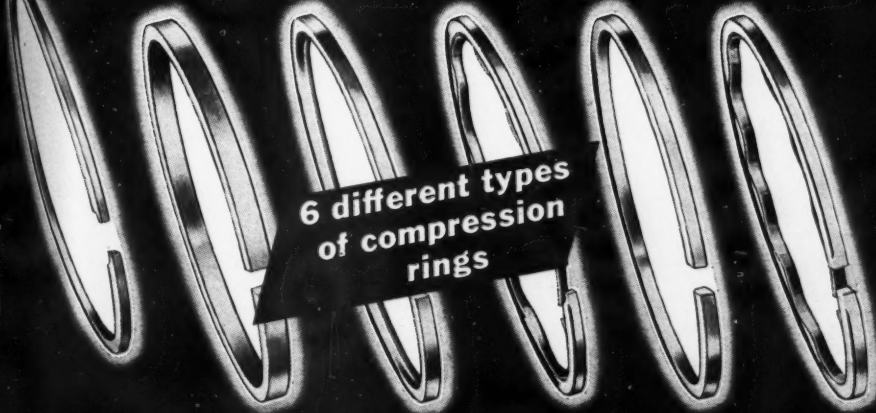
Loss of Fixtures

THERE'S a reminder in a recent federal court decision that a repairman operating in a rented building may lose his fixtures to the landlord when he removes from the place.

"Where a lessee is given the right to remove fixtures," says the federal court, "he must exercise that right within a reasonable time. When the lessee fails to remove the fixtures within a reasonable time he loses his right thereto."

To be safe in this matter, the repairman renting a building for his business should make sure that the lease gives him the right to remove his fixtures. It should also specify definitely the time within which he is privileged to remove them, so that there may be no controversy over how long is a "reasonable time." Some leases provide that fixtures must be removed before the end of the term of the lease. In the federal case cited, the lessee lost his fixtures for failure to remove them "within a reasonable time." (*Smith vs. United States*, 113 Federal Reporter, second series, 191.)

and McQUAY-NORRIS makes all /3/



6 different types
of compression
rings

That's why McQuay-Norris Altimized Engineered Sets are different from ordinary ring sets. McQuay-Norris has the right kind and type of rings for each make and model of car. That's what we mean by Engineered Sets. It's real engineering and not just a package label that makes them.

McQUAY-NORRIS MANUFACTURING CO.
Piston Ring Headquarters

DEFENSE AND YOUR MECHANICS

(Continued from page 29)

must be manned when completed, and will exert a further drain on the labor supply. Further, induction under Selective Service has not yet reached the maximum. If the supply of mechanics is adequate at the moment, the situation is in the nature of a respite, to give the shop owner time to consider what to do about a labor shortage if it grows acute.

A good many shops are already turning to the graduates of training

courses conducted by vocational schools, the National Youth Administration, car factories, and various other public and private agencies. The experiment has been far from satisfactory. Training programs differ so widely in length and method that comparison of the graduates is almost impossible. Many schools stress theory to a degree considered needless by shop operators, and virtually none produces mechanics capable of should-

ering a full load in an actual shop. Shop owners who have tried these boys or retrained men agree that even the best need three to four months' patient coaching before they can pay their way.

Furthermore, these recently trained mechanics are no more proof against the allurements of defense work than are more experienced men. One shop owner hired a lad fresh out of vocational school, liked his aptitude for learning and his willingness, and coached him personally for four months. Then the boy left for a job at a government arsenal.

Of late the suggestion has frequently been made that older men, say from 45 years up, who were forced out of jobs a few years back by younger and more active men, might be called upon to replace mechanics lost to defense industries or the draft. Here and there a shop has taken up the suggestion, and has made several interesting discoveries. The first is that many of these older men, when they can be found, are often incapable of mastering the new developments in automobile design or refuse to give up the slower methods that prevailed when they left the trade. A more important discovery has been that these men have found places for themselves in other lines, and now have no desire to return to an automobile shop. Employment agencies say older men could be placed but cannot be found.

One shop, which does considerable body work, is filling the gap left by the departure of mechanics for shipyard jobs by hiring men from other shops to work at night. This, of course, is only a stop-gap and not a solution.

It is possible that a point may be reached when service shops will have no alternative to hiring hastily trained or partially trained men, and undertake the trouble and expense of completing their practical education. The prospect is not encouraging, but neither is it inevitable. Shops can keep a good proportion of their experienced men if they approach the problem with an open mind.


In shifting from an automobile repair shop to a defense plant, the mechanic may have many motives, but it does not take a cynic to discover that the chief of these is the hope of a thicker pay envelope. In a metropolitan area, the envelope is likely to be considerably thicker. At prevailing hourly rates in service shops, the mechanics in one big city make \$25 to \$30 a week. Defense jobs for which these men could qualify pay a great deal more.

For example, a plant supplying ordnance material pays piece rates that enable men on the assembly lines or at automatic or semi-automatic machines to earn about \$42 for a 40-hour week. Navy yard jobs requiring comparable skill pay about the same.

However, men who can qualify as
(Continued on page 64)

Exclusive!

**"THESE KITS SURE STRETCH
SALES AND DO THE JOB BETTER!"**

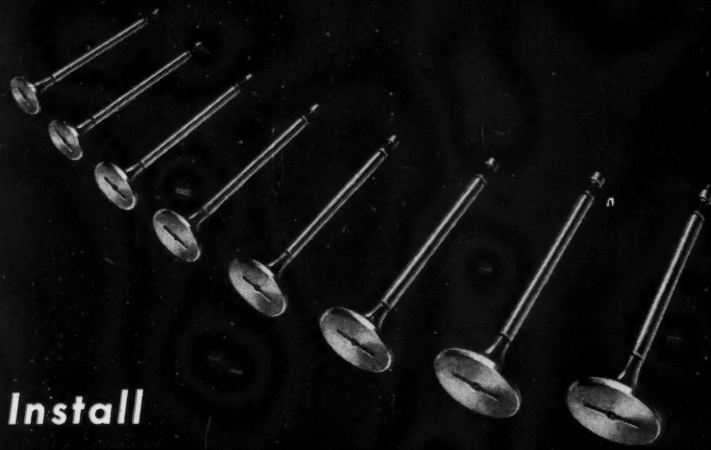


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**only McQUAY-NORRIS offers
THE 3 MOST VITAL PARTS
IN THE CONTROL OF OIL IN
1 PACKAGE... 1 JOB NUMBER
...LOWER PRICES**

- 1** Altinized *Engineered* Piston Ring Sets
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- 3** Engineered Piston Expanders

To Give your Customers
Every Last Mile



Install

RICH VALVES

of Silcrome-X Steels

MCQUAY-NORRIS JOBBERS

SHOP KINKS



Here's your chance to pick up a little cigarette money. We'll pay three bucks (\$3.00) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and quicker than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest. Here are some that were accepted this month:

THAT BROKEN KEY

When the door handle key breaks off in the lock, it is not necessary to remove the door handle and take the lock apart to get the key out.



Take a heavy piece of copper wire, bent over on the end to give a broader surface, and tin it heavily. Then put a small amount of soldering flux on the end of the broken key. Hold the tinned end of the copper wire against the end of the key, and apply heat to the wire. This will soften the solder and cause it to stick to the end of the key to which the flux was applied. Then you can draw the broken key out of the lock with no trouble.

When applying the solder flux to the key, use a tooth pick so you will not smear the flux on the lock. *O. W. Wilson, Alexandria, Ind.*

FIRE EXTINGUISHERS

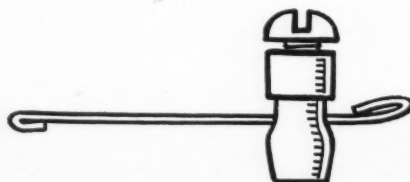
An inexpensive fire extinguisher can be made by using burned-out light bulbs. Immerse the bulb in a pan or bucket of carbon tetrachloride and, with a small drill, drill a hole through the small soldered spot in

the base of the bulb. As soon as the drill penetrates, the vacuum in the bulb will draw in the carbon tetrachloride, filling the bulb. Then remove the bulb and seal the hole with wax.

Keep these bulbs around in various parts of the shop where they can be reached instantly. Then, in case of fire, throw them at the base of the flames. The bulb will break, of course, releasing the carbon tetrachloride, which will smother the fire.

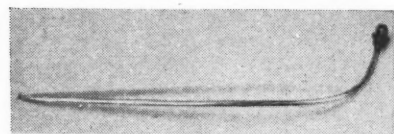
PULL CABLE END

When the end of the hand throttle cable or the end of the hood latch cable comes off and gets lost, I simply make one to replace it. Use the screw terminal from a spark plug. Drill a $\frac{1}{8}$ in. hole horizontally through the center for the cable to enter, run a small machine screw down in the threaded part of the terminal until it clamps the cable, and it's all done. *J. T. Johnson, Box 251, Alpine, Texas.*



UNIVERSAL JOINT GREASER

Here is a tool I made for greasing the Detroit type universal joint when there wasn't time to remove the shaft and repack the joint. It is made on the principal of a hypodermic needle. Use a 6-in. length of small tubing (like the tubing used for the old-style gas gage air line), sharpen one end to a point and to the other end solder an Alemite fitting from which the check has been removed. Insert the

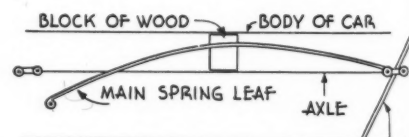


needle through the boot and hold the high-pressure grease gun against the fitting. Give it one or two shots, and the boot is packed. *Tom LeRue, 2111 Main St., Parsons, Kan.*

INSTALLING FRONT SPRINGS

Without a spring spreader, it has been considered just about impossible to install a front spring in late model Ford cars. Since we do not have a spreader, we were forced to send this work out to a competitor who had one, until I finally worked out a way to do the job without the spreader.

Disassemble the new spring and install the main leaf only, as shown in the diagram. Then place the shorter leaves of the spring on top of the main leaf, draw them together with a C-clamp and install the center bolt. *Harold J. Schafer, 362 North Genesee St., Utica, N. Y.*



TIRE IRON - TO HOLD SPRING SHACKLE EXTENDED TOWARD OPPOSITE END OF SPRING

TROUBLE SHOOTING WITH A VOLTMETER

Here is a method I use to locate trouble in the distributor, and it may be of assistance to the rest of the boys.

Connect a voltmeter across the breaker points and ground, and with the motor idling you will get a reading of from one to three volts. Then reach over to the carburetor and pop the throttle open. If the voltmeter needle steps up or down to a new reading it indicates that the point gap is changing with the vacuum advance, and that a new breaker plate is needed because the old plate is not moving concentric with the distributor shaft. *Oliver W. Layfield, Radnor Garage, Radnor, Pa.*

CLASS OF SERVICE

This is a full-rate Telegram or Cable message. It is delivered by the fastest means available and is subject to the same conditions of service as the Telegram or Cable message.

WESTERN UNION

NEW YORK, N. Y.

CHICAGO, ILL.

ST. LOUIS, MO.

PHILADELPHIA, PA.

PITTSBURGH, PA.

RICHMOND, VA.

WASHINGTON, D. C.

WHEELING, W. VA.

SYMBOLS

W—Wire Line

MT—Mountain Telephone

EC—Eastern Cable

MT—Cable High Line

W—Radio

ESTER UNION

STANDARD TIME INDICATED

RECEIVED AT

SOUTH BEND, IND.

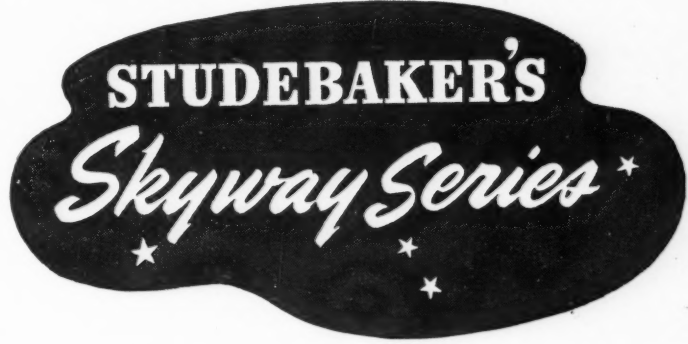
TELEPHONE YOUR TELEGRAM TO POSTAL TELEGRAPH

Postal Telegraph

THIS IS A FULL-RATE TELEGRAM. CABLES ARE DELIVERED BY THE FASTEST MEANS AVAILABLE AND ARE SUBJECT TO THE SAME CONDITIONS OF SERVICE AS THE TELEGRAM. CABLES ARE DELIVERED BY THE FASTEST MEANS AVAILABLE AND ARE SUBJECT TO THE SAME CONDITIONS OF SERVICE AS THE TELEGRAM.

The wires are hot with words of praise for

America's newest most beautiful car



STUDEBAKER distributors and dealers have hit the jackpot again! Again they have the hottest line of new cars in all America—the thrillingly beautiful new Studebaker Skyway Series models.

And do they feel good about it? Well, the wires reproduced here give you some idea.

Sensational public approval!

These grand new Skyway Series models—available on the Commander and President Eight chassis—have pepped up the business of every Studebaker distributor and dealer in the land because they've come out right now when Spring buying is speeding up.

Once again Studebaker has timed its production and merchandising program right on the head with public demand—and Studebaker showrooms are packed with prospects!

Forge ahead with Studebaker!

Why don't you line up with Studebaker now and build up a real business for yourself? Write or wire about the franchise possibilities in your territory. Address Paul G. Hoffman, The Studebaker Corporation, South Bend, Indiana.

WITH THE ADDITION OF THE SKYWAY SERIES, STUDEBAKER WILL BE HOTTER THAN EVER.
DAHL MOTORS

SINCE INTRODUCTION OF SKYWAY MODELS OUR CUSTOMERS ARE VERY ENTHUSIASTIC ABOUT THEIR SMART OUTSTANDING APPEARANCE.
H. M. WILLIAMS, PRESIDENT,
H. M. WILLIAMS CO., INC.

CHICAGO, ILL.
K. B. ELLIOTT
"NEW SKYWAY MODELS PAVED THE WAY FOR THE BIGGEST MONTHS WE HAVE HAD IN THE HISTORY OF THE STUDEBAKER SALES CO. OF CHICAGO."

CANNOT SAY TOO MUCH IN PRAISE OF THE NEW SKYWAY MODELS. OUR PROSPECTS SAY THE COLOR COMBINATIONS AND INTERIORS ARE THE MOST BEAUTIFUL ANY CAR.
JOHN C. KRAMER MOTOR CO.

THE NEW SKYWAY MODELS ARE A KNOCKOUT HIT WITH INSTANT AND ENTHUSIASTIC PUBLIC APPROVAL. OUR SALESROOM OPINION THESE CARS ARE THE MOST OUTSTANDING MODELS WHICH HAVE BEEN INTRODUCED THIS SPRING.
A. R. GRIBBEN MASTER MOTORS

IN 17 YEARS I HAVE NEVER SEEN SUCH ENTHUSIASTIC APPROVAL OF A NEW MODEL BOTH BY THE PUBLIC AND FROM OUR ENTIRE ORGANIZATION AS THE NEW SKYWAY SERIES PRODUCED. WE NOW HAVE NO COMPETITION.
L. E. BAKER, PRESIDENT,
TRI MOTOR CO.

HAVE RECEIVED SKYWAY MODELS ARE BEING RECEIVED WITH VERY MUCH ENTHUSIASM BY DEALERS SALES AND PROSPECTS CONGRATULATIONS YOURS. TRULY
ANDY SCHAIN

WITHOUT A DOUBT THE NEW SKYWAY SERIES ARE THE MOST STRIKING AUTOMOBILES STUDEBAKER OR ANY OTHER MANUFACTURER HAS EVER BUILT. DEALERS AND PUBLIC ARE UNANIMOUS IN THEIR PRAISE.
KAUFMAN MOTORS

MY NEW SKYWAY DEMONSTRATORS ARE HOLDING UP THE TRAFFIC IN DOWNTOWN PITTSBURGH.
HAL B. REA

ACCEPTANCE OF SKYWAY MODELS OUTSTANDING PROSPECTS ARE COMPARING IT FAVORABLY WITH THE VERY HIGHEST PRICED CARS. SOLD FIVE THE FIRST 3 DAYS SHOWED IT.
STARCHER HARVEY MOTORS, C. C. HARVEY

TOWN GONE WILD ABOUT NEW SKYWAY MODELS. MOST GLAMOROUS CARS EVER PRODUCED BY ANY MANUFACTURER. FLOOR PLAY MORE THAN DOUBLED.
CARL E. FILER CO.

SKYWAY BEING ENTHUSIASTICALLY ACCEPTED BY DETROIT'S PUBLIC. OUR DEALERS AND ENTIRE ORGANIZATION STOP INTERIORS AND EXTERIORS GRANDER EVER PRESENTED. STOP CONGRATULATIONS TO YOU AND STUDEBAKER'S DESIGNERS FOR CREATING THIS SENSATIONAL SERIES AT THIS OPPORTUNE TIME.
PAT ODEA

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Defense and Your Mechanics

(Continued from page 60)

machinists, welders or as journeymen in other skilled trades can command \$1 to \$1.10 an hour. The latter rate gives a man more than \$48 for the usual 44-hour week. Of course these figures do not take overtime into consideration. Under such conditions, skilled workers may find \$65, \$75 or even more in their weekly pay envelope.

The usual shop holds it useless to compete against wages of that kind. With costs adjusted to current cus-

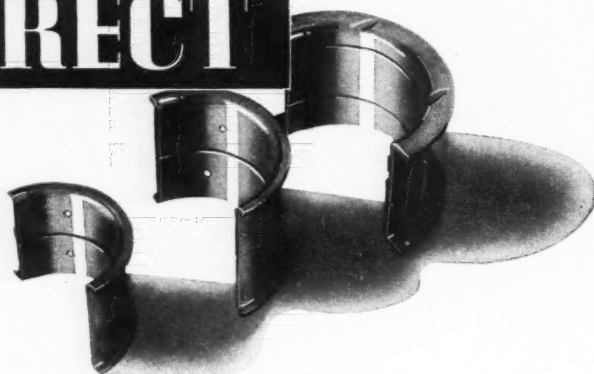
tomers prices, they feel that boosting hourly rates to such an extent would be ruinous. Undoubtedly, there is some basis for their argument, yet it is enlightening to study the experience of a few shops that permit their mechanics to earn wages comparable to those paid in defense industries.

Among the independent and dealer shops visited in the attempt to learn something of the labor situation were two that had not lost a man to defense industries. One of them, because of



CORRECT

- DESIGN
- ALLOY
- TOLERANCE



JOHNSON BRONZE

Slip-in Bearings

Johnson Automotive Bearings are made to fit . . . and to last. Correct in every detail . . . DESIGN . . . ALLOY . . . TOLERANCE—they slip right into place with a minimum of effort. Once installed, they deliver maximum performance.

*Write for
FREE
Catalogue*

There are many reasons for this consistent quality. For more than 30 year's Johnson Bronze has remained a preferred source of supply for original equipment. Skilled men . . . up-to-date methods . . . modern equipment combine to give you the finest bearings available. Why not try a complete set on your next job? Your local jobber carries complete stocks.



JOHNSON BRONZE

Sleeve BEARING HEADQUARTERS
455 S. MILL STREET • NEW CASTLE, PA.

expanding business, had hired two mechanics in recent weeks, and had experienced no difficulty whatever in finding qualified men. Both shops pay their mechanics on a flat-rate basis.

In one, the men receive 40 per cent of the labor price to the customer, and are guaranteed \$35 a week. None of the six mechanics ever fails to make more than his guarantee. Usually the weekly earnings are above \$40, and frequently reach \$48 or \$50. It is an exceptional defense job that pays more for straight time. The other shop pays its mechanics only 35 per cent, yet even at this price the men make upwards of \$40 a week.

These shops may not continue to hold their men. As the demand for defense labor increases, war plant wages probably will increase, and earnings of \$40 to \$50 weekly may no longer be sufficient to keep mechanics anchored to automotive shops. Yet the situation in these shops up to now is instructive when contrasted with that of competing shops. A dealer not far from one of the flat-rate shops pays mechanics straight hourly rates, and has lost five of his mechanics in the last six months. He has been able to replace them, but the new men required some breaking into the shop routine. One shop has been forced to pay higher hourly wages to get men capable of doing the class of work it demands.

Paying mechanics flat rate is not complete insurance against a prospective shortage of men. Many shops have tried it and abandoned it. To keep the men satisfied, the shop must provide a continuous flow of work, and in the past this has not always been easy to do. Today the automotive service business is active enough to keep shops busy and indications are that it will be more active still. Keeping men busy should be no problem at all.

(Continued on page 69)

MECHANICS

(Continued from page 64)

Distributing the work fairly is a bit tougher task. Handing a job to the first man free is the usual rule, but from the management's standpoint it is not always the wisest one. Another man may be more skilled on a particular job, yet, if the job is given to that man out of turn, it can easily set off a serious wrangle. One of the flat-rate shops just mentioned overcomes the difficulty by pooling the earnings of its four mechanics and distributing them equally at the end of the week. In this instance, the plan works well.

Higher earnings are unquestionably the bait that lures mechanics from automobile shops, yet the pay envelope itself is not always enough. Working conditions are important. A clean, well-lighted shop, as comfortable in winter as in summer, is not quit with the same alacrity as one that is dark, grimy, and drafty. Clean wash rooms and lockers are valued by most workers.

Where the mechanic lives conveniently near the shop and is established in the community, and working conditions suit him, it takes more than just a few dollars more a week to persuade him to change. The difference in earnings has to be more pronounced than it seems to be at present.

There are men, of course, whom no inducement can hold. They like a change of scene, of routine, and even of bosses. And probably the majority put a high hourly wage above everything else. Still an attempt to hold competent, experienced mechanics seems wise.

Undoubtedly this will require patience and effort and perhaps compromises, but, if the experience of shops up to now is any guide, it will call for less patience and cause fewer headaches than breaking in sketchily trained or incompetent mechanics.

Airplane Propeller Plant Is Nearing Completion

The new plant of the Aeroproducts Division of General Motors Corp. at Dayton is approaching completion and production of airplane propellers in this plant is scheduled to begin in July, C. E. Wilson, president of General Motors, has announced.

Last June, General Motors acquired the propeller business of Engineering Products, Inc., which had been working on the development of a hydraulic airplane propeller for several years. It was anticipated that in the normal course of events the corporation would begin the manufacture of propellers after about three years of preparation. Due to the national defense demand, however, development work was intensified and, with the cooperation of the

Materiel Division at Wright Field, Dayton, a propeller recently passed Army tests.

Even before tests were made, and in anticipation of the demand for the propeller in the defense program, construction and equipment of a plant were begun last fall.

General Electric Co. Orders Highest in Company's History

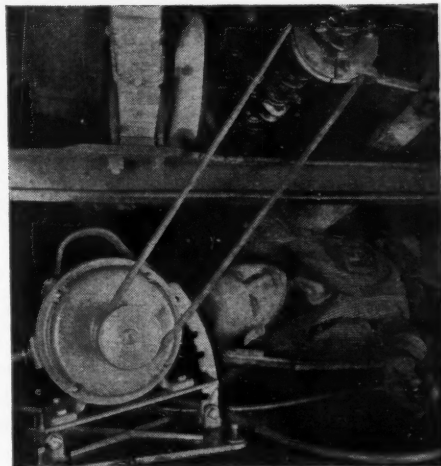
Orders received by General Electric Co. during the first quarter of 1941 amounted to \$257,382,000 compared

with \$97,490,000 during the corresponding period a year earlier, an increase of 164 per cent, President Charles E. Wilson announces. This was an all-time record amount of new business for a three months' period.

During the first three months of this year orders definitely known to cover equipment for national defense purposes amounted to approximately \$112,000,000, and, exclusive of such business, the orders for regular commercial products amounted to \$145,382,000, or 68 per cent more than for the first quarter of 1940 on a comparable basis.

LEMPCO Builds the only PORTABLE CRANKPIN GRINDER that Gives you ALL these Advantages on EVERY Car!

1. Grinds any "throw" on all cars and trucks.
2. No hoisting or jacking up car. Can be used with car in any position.
3. No removal of cylinder head and pulling out pistons.
4. NEVER necessary to remove front axle, steering gear, or knee action mechanism on front "throw" jobs.
5. Grinds all counter balanced crankshafts without removing the weights.



6. Does a better, more accurate job in $\frac{1}{3}$ to $\frac{1}{2}$ the total time required when using other machines designed for the same purpose.
7. Costs less to own — pays for itself faster.

The NEW IMPROVED 1941 Crankpin Grinder

The Lempco Portable Crankpin Grinder actually has **so many** points of superiority over ordinary portable grinders that you can't afford anything but a Lempco in your shop. You'll find it one of the best profit investments you ever made.

Mail the coupon for the complete story and Lempco's easy time payment plan.

LEMPCO PRODUCTS, Inc.
BEDFORD, OHIO

Please send me a catalog on the Lempco Portable Crankpin Grinder and all particulars on your easy Time Payment Plan.

NAME.....
ADDRESS.....
CITY.....

INDIANAPOLIS PREVIEW

(Continued from page 23)

drivers in past years, George Barringer, driver, and even old Herman Rigling, tin-knocker par-excellence, in there pitching to make the cars even more beautiful than ever before. They intimated the two cars in this year's race would be painted ox-blood red, and royal blue.

They have made some changes, none radical, in their body designs and chassis, along with minor changes in the engines enabling them to get additional horsepower. More impor-

tant was Eddie's remark: "With the tests we've made on these jobs, we are confident they will run the entire 500 miles of the race without any failures, we hope." Everyone connected with this team seems to be all pepped up with its fine chances in this year's race. They base their hopes on the fact that George Barringer, their star driver, recently set up 33 new international and American records at the Bonneville Salt Flats, in Utah, proving the car's ability to run and keep



SNAP-ON speed design of such basic tools as end wrenches, boxsockets, and combinations is more than a phrase, more than mere appearance. It's the actual, noticeable difference in the "touch" a genuine Snap-on imparts, the smooth, fast way it slips into accurate position on the work, the "feel" of the tool as it takes hold . . . refinements that add up to greater working confidence, greater individual skill and output. Only the finest steels are used in Snap-on tools, only the "cream" of tool craftsmanship, backed by a 20-year record of leadership in fine tool design . . . your guarantee of quality and performance in every Snap-on tool you buy. There are over 2200 tools in the Snap-on line . . . see your Snap-on salesman, or write

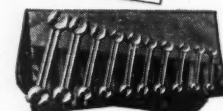
SNAP-ON TOOLS CORPORATION
Dept. MA-5 • • • Kenosha, Wisconsin



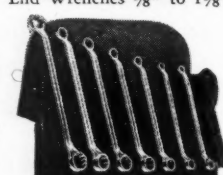
★
BUY
BASIC TOOLS IN SETS

Having the right size tool at the right time is the easy way to do fast work, the sure way to accuracy . . . that's why it pays to buy your basic Snap-on tools in complete sets.

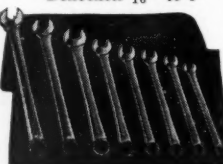
Snap-on SERVICE TOOLS
The Choice of Better Mechanics



BPS-10K Set Supreme Open End Wrenches $\frac{3}{8}$ " to $1\frac{1}{8}$ "



X-70K Set Double Offset Boxsockets $\frac{1}{8}$ " to 1"



8K-LOEX Combination Wrench Set $\frac{1}{2}$ " to 1"

Emblems

The automobile emblems which are illustrated on page 50, but which have the identification blanked out, are as follows:

- 1, Chandler; 2, Velie; 3 Stearns;
- 4, Standard; 5, Rollin.

running. The two drivers of the cars in this year's Indianapolis race will be George Barringer and Al Miller.

The news that Chet Miller, diminutive popular star, who is regarded as one of the best front-wheel-drive car pilots, will again join the Boyle Valve racing team served as music to the ears of the other drivers, who consider Chet a swell little guy. In last year's race, Chet tried his hand at the wheel of an Italian Maserati, to no avail. This year he will be at the wheel of the same front-wheel-drive car with which Ted Horn placed fourth last year. It is an 8-cylinder job with 268 cu. in. displacement, non-supercharged, and is capable of developing 275 hp., according to "Cotton" Henning, president, chief engineer, and general manager of this "go-ahead" Boyle Valve organization.

Among the other members of the Boyle Valve team is Wilbur Shaw, three-time winner, who will drive the same car in which he won the last two Indianapolis races, an 8-cylinder Maserati, 179-cu. in. job, supercharged, with 355 hp. rating, according to Cotton. The third car is a 4-cylinder Miller-Offenhauser, 257-cu. in., non-supercharged, conventional rear-drive, to be driven by George Connors, the San Bernardino, Cal., dirt track star.

From Los Angeles, we have news that Joel Thorne, millionaire race car owner and driver, will bring back two of his cars for the Indianapolis event this year. He will personally drive one of the cars, but as yet the driver for car No. 2 hasn't been named. These jobs will be entered by T. E. C. Thorne Engineering Corp., which is owned by Joel Thorne, at Burbank, Cal.

About the only new equipment to make its bid at Indianapolis this year from the West Coast will be a new V-8 Offenhauser-built engine, designed and supervised by Fred Offenhauser, Bud Winfield, and Leo Goosen. This engine will be installed in the Bowes Seal Fast front-wheel-drive. Ralph Hepburn, an old-time motorcycle champion, who drove the car last year, has again been named as driver. The engine is really something different and embodies many innovations particularly in the way of "intercool-

(Continued on page 72)

Already On The Job!



Former Janesville Chevrolet and Fisher Body employees, now serving with the armed forces of the U. S. A., inspect newly delivered Chevrolet trucks at Camp Beauregard, La.

...and thousands more Chevrolet trucks are on the way, to meet the needs of National Defense!

This nation has summoned all Industry to its side and given Industry the biggest job in the world—the job of producing for National Defense.

To Chevrolet, months ago, in the earliest days of the emergency, there came an urgent call for trucks—and still more trucks—for the U. S. Army.

Today, it is a pleasure to report to the American people that great numbers of Chevrolet trucks are *already on the job* at Army camps in all parts of the country.

Thousands of additional Chev-

rolet trucks are on the way. . . . Other thousands will continue to roll off our assembly lines as long as they are needed . . . smoothly, steadily, in ever-increasing numbers, to help meet one of the most vital needs of modern defense—an army equipped to move swiftly over any type of ground.

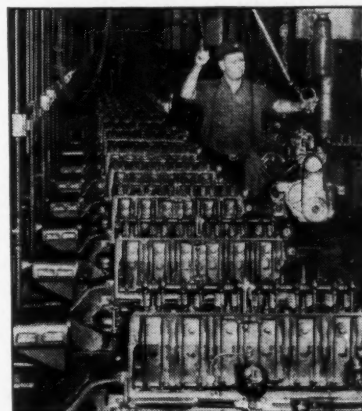
America has helped to make the Chevrolet Division of General Motors one of the largest manufacturing units in the world; and, of course, America can count on Chevrolet to contribute its full share to the biggest job in the world—National Defense.

CHEVROLET

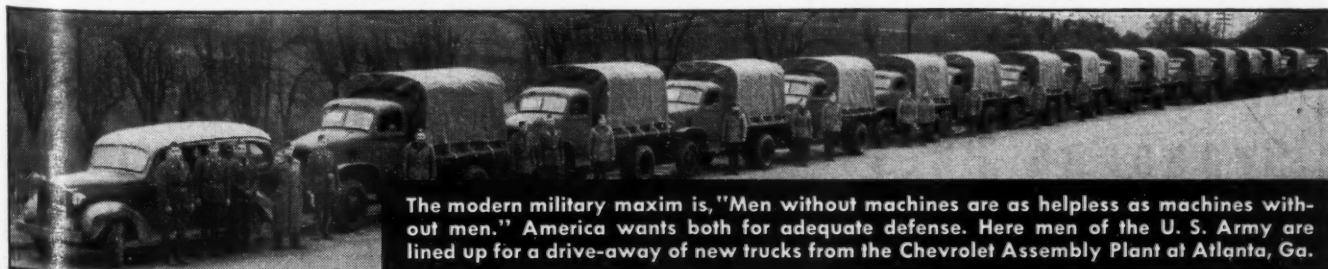
CHEVROLET MOTOR DIVISION, General Motors Corporation, DETROIT, MICHIGAN



The Chevrolet 4 x 4 is a widely used Army truck. Long lines are shown awaiting shipping instructions at the Oakland, California, Chevrolet Assembly Plant. A concrete example of the part Chevrolet is playing in providing this country with an army equipped to move swiftly over any type of ground.



Placing motors on test blocks at Chevrolet plant, Flint, Mich. Motors are shipped from this plant to be assembled in U. S. Army trucks at Chevrolet Assembly Plants throughout the country, in addition to assembly operations at Flint.



The modern military maxim is, "Men without machines are as helpless as machines without men." America wants both for adequate defense. Here men of the U. S. Army are lined up for a drive-away of new trucks from the Chevrolet Assembly Plant at Atlanta, Ga.

INDIANAPOLIS PREVIEW

(Continued from page 70)

ing" between the supercharger and the intake manifolds. It has a set up of three carburetors feeding through the supercharger, and the entire top of the V-8 engine is covered with cooling radiators of the fin type, which are supplied with air through a duct from the front of the car through the regular radiator. These cooling radiators lie flat across the top of the engine, and are about two inches thick. Naturally, both of the Bowes entries will use Bowes spark plugs.

Kelly Petillo, unless he is called over to help his countrymen advance further into Rome, will undoubtedly be at the wheel of the same 4-cylinder car in which he won the 1935 Indianapolis race. It seems that, in spite of all the redesigning and changes he has made on this car since his 1935 victory, results have been most discouraging. His thoughts of buying one of the two Maserati cars, which were driven in the 1940 race by the French team of Rene Dreyfus and



Age and youth are combined in this racing team of the Bowes "Seal Fast" Corp. Rex Mays is shown at left, with Ralph Hepburn at the wheel of his new V-8 front drive.

**"READY-MADES" THAT ARE "CUSTOM-BUILT"
TO REPAIR SHOP SERVICE**

HALLOWELL

STEEL BENCHES

These prefabricated benches are THE answer to your special requirements. With "Hallowell" Benches your full cost is predetermined, you eliminate costly wastes—time and trouble of layout, figuring lumber and labor costs. And, "Hallowell" Benches are easily moved wherever, whenever they're needed. Where wooden benches become shaky wrecks, "Hallowell" Benches stay rigid and firm.



Pat'd. and
Pat's. Pending
Fig. 732 Drawer is extra.



Fig. 1117
All laminated wood
top for light or
precision work
—footrest below.

COMPLETE CATALOG

free on request. Complete description and prices of all the "Hallowell" models. Write now!

More than 1300 "Hallowell" styles and types are in stock, knocked down. All have flared sturdy STEEL pyramid leg construction which not only insures permanent rigidity but also makes fastening to the floor unnecessary—a great saving as drilling holes in hard concrete is slow work and very costly.

Top may be of steel, laminated wood, Masonite or linoleum; they defy time and abuse—can't split, splinter or soak up oil.

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 561

BRANCHES

BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO

Rene Lebegue, have evidently been blasted sky-high, as was expected.

Sampson Motors, Inc., from Los Angeles, will again have their 16-cylinder car in readiness for this year's race, but the drivers have not yet been named. Riley Brett, chief engineer with this set-up, makes great claims for this year's performance with his car, providing a driver can be found who will get the most out of this car, which has proved to be very fast and easy to handle.

Thus, practically the same cars which participated in the 1940 race will again be on the starting line at Indianapolis this year. Improvements that have been made will help make them faster and sturdier in the hope of setting up a new record. With drivers in tip-top physical trim, those in the grandstands should see the finest exhibition they have ever witnessed on the Indianapolis Motor Speedway.

Unless Uncle Sam calls the writer back into service, he will be at the Indianapolis Speedway, as usual, from May 15 until after the race, looking for you so that we can discuss further the possibilities of Floyd Roberts' record of 117.200 m.p.h. being broken.

See you at Indianapolis!

E. R. Kroblen Appointed Sales Manager By Reo

Appointment of E. R. Kroblen as general sales manager of Reo Motors, Inc., has been announced by Henry E. Hund, president of the company.

Kroblen is a veteran of the Reo organization. Twenty-five years ago he started with the Omaha branch and subsequently served in various sales capacities, both wholesale and retail. For the past three years he has been manager of the Chicago branch.

As advertised
in
COLLIER'S
April 26th
and in
SATURDAY
EVENING POST
May 17th

WAGNER helps You Make Sales --here's how!

"Isn't Your Life
Worth A Quarter?"



for SAFETY'S SAKE keep the master cylinder filled to the proper level with genuine **WAGNER LOCKHEED HYDRAULIC BRAKE FLUID**

The hydraulic brakes on your car are built so well that you may drive a long time without giving them a thought. They need very little attention, but for safety's sake it is wise to have the brake system checked at regular intervals. Inspection may disclose that all that is required is the addition of a small quantity of Wagner Lockheed No. 21 brake fluid. Surely your life, and the lives of others, is worth a quarter! Yet 25c is all you have to pay for a factory-sealed 3-oz. can of Wagner Lockheed No. 21, a can containing enough to bring the fluid back up to the proper level in the average master cylinder.

**LOCKHEED NO. 21 IS AN ALL-WEATHER
YEAR-ROUND BRAKE FLUID FOR ALL
CARS AND TRUCKS**

Lockheed No. 21 is unqualifiedly recommended for all hydraulic brake systems. Behind

Lockheed brake fluid products are sixteen years of Wagner development, research and service experience. Lockheed No. 21 retains its highly efficient qualities under all driving conditions... Completely and properly mixes with other approved brake fluids... Furnishes necessary lubrication for working parts of the hydraulic brake system... Minimizes corrosion... In general, preserves the essential characteristics of the entire system... Used and approved by car and truck manufacturers.

**HEED THE ADVICE OF YOUR
AUTOMOTIVE SERVICE MAN**

If, after your car has been driven thousands of miles, inspection discloses the need of new parts in the brake system—don't gamble. Get the benefit of a nation-wide service program carried out by trained men who recognize the value of genuine Wagner Hydraulic Brake Parts and Fluid.

Take Care of Your Brakes, and They'll Take Care of You

**HAVE YOUR CAR CHECKED PERIODICALLY
at a STATION DISPLAYING THIS SIGN**

Patronize the service station displaying the Wagner red, white and blue sign. You will find the shop has special modern equipment and can supply genuine Wagner Lockheed Hydraulic Brake Fluid and Brake Parts. Since good brakes are so important, don't guess about the condition of the brakes on your car. Have your car checked TODAY at the nearest authorized station. Automotive Parts Division, WAGNER ELECTRIC CORPORATION, 6400 Plymouth Avenue, St. Louis, Mo., U. S. A. (In Canada: Wagner Brake Service Company, Ltd., Toronto).



Wagner

**LOCKHEED HYDRAULIC BRAKE PARTS and FLUID...
AIR BRAKES...CoMaX BRAKE LINING...NoRoL...TACHOGRAPH**

WAGNER red, white and blue half-page ads in Collier's and in Saturday Evening Post are directing attention of the public to importance of safe brakes

Millions of owners of cars and trucks see Wagner advertisements, one of which is reproduced in miniature at the left. These common-sense safety messages are causing people to have brakes inspected and serviced—*so act now* and identify YOUR shop with this program.

Your Wagner jobber can supply you with service information, outdoor signs, decals for your windows and gas pumps, service caps for your men, cards to mail to car owners, and mats for local newspaper ads.

**DISPLAY THIS
METAL SIGN
--and cash-in on
Wagner program**

Start now by procuring the metal flange sign reproduced in miniature at the right. Mount it outside your place of business and identify yourself with this national service program.



**For Safety and
Maximum Brake Performance**



**NEW 1941 CATALOG IS
FREE to repairmen.
Did you get your copy?**

Over 90,000 copies were mailed with the April issue of Automotive Merchandising magazine. If you did not get a copy of HU-122, request one from your Wagner jobber, or use the coupon.

Clip and Mail Coupon Today!

AUTOMOTIVE PARTS DIVISION

H41-14
MA

Wagner Electric Corporation
6400 Plymouth Ave., St. Louis, Mo., U. S. A.

☐ Send FREE Catalog HU-122.
Send information on items checked... ☐ Wagner Lockheed Hydraulic Brake Parts... ☐ No. 21 Fluid... ☐ Service Tools and Equipment... ☐ FREE advertising helps.

Name and Position

Firm

Address

City and State

I Buy My Parts From

FUEL TANKS Here are Goodrich employees working on fuel tanks for combat airplanes. Special rubber linings and coverings make possible the rapid sealing of holes caused by machine gun fire, preventing gasoline wastage and consequent forcing of the plane out of action.



TOPS-IN DRYING SPEED
-IN RESULTS...



The New ARCO INFRA-RED DRYING LAMP

Spotting-in enamel an all-day job? Not with Arco's new Infra-Red Drying Lamp. The job dries thoroughly in as little as 8 minutes. And the arrangement of the bulbs assures uniform drying with no dead spots. It will be a *good* job, too, if you use Arco Synite... specially formulated for forced as well as air drying. No wrinkling. No sagging. No tackiness.

3 BIG FEATURES

The new Arco lamp is tops in SPEED—tops in RESULTS because: (1) Its 6 bulbs, instead of the usual 4, give 50% more drying area; (2) Its *sealed-beam* bulbs can't be reached by dirt and spray dust; (3) Its tungsten filaments last thousands of hours longer than old-style carbon lamps.

For details write Dept. M-5

THE ARCO COMPANY
Cleveland Los Angeles

Arco's Sealed-Beam Bulbs stay bright and effective. No reflectors to clean or replace.



ARCO SYNITE
(SYNTHETIC ENAMEL)

Substitute Materials Not To Affect Quality

Service men probably are beginning to wonder just what will happen to the automobile of tomorrow considering the talk about "substitutions" for materials essential to national defense. While no one knows exactly where the pinch will come, this much is certain; the principle of using "competitive" materials is well established in engineering practice.

As far back as you can recall, there was always a time when die-cast parts were competing with steel stampings. More recently plastics have been encroaching on the baliwick of die castings and stampings and other things. Stainless steels, plastics, zinc die castings, aluminium, alloy steels, and the host of other materials required for decorative and structural purposes are constantly in competition with each other.

What is happening today is simply that national defense conditions have made it possible for competitive materials to enjoy a free market during the time that certain well-intrenched materials and alloys have been placed on the priorities list. This does not mean that the competitive materials are in any sense inferior. No reputable manufacturer would use materials that will not stand up.

It does mean, as observers see it, that, when restrictions are lifted, some of the materials now restricted will automatically come back into use. In other cases, competitive materials will make it pretty tough for the restricted stuff to make a comeback.

In any event, MA readers can be confident that the automobiles built under national defense conditions are going to be good. They will not be based on the "ersatz" substitutes that have been used in Europe.

Acquires New Line

Sure-Rite Products Corp., Philadelphia, Pa., has acquired the manufacture and sales of S-P-E-E-D-E-E free flowing spark plug cleaning abrasive, from the American Silica Co., Brooklyn, N. Y. This product will be added to the Sure-Rite line and sold through jobbers.

"We're Happy!"

-our business increased 56.5%!

BIGGEST sales increase in the industry in 1940. And Public preference for Chrysler continues its amazing growth. No wonder Chrysler dealers are happy!

The biggest sales features in the industry account for these swiftly mounting sales! *Fluid Drive*...Vacumatic transmission...Airflow bodies...Tailored-to-Taste inside and out.

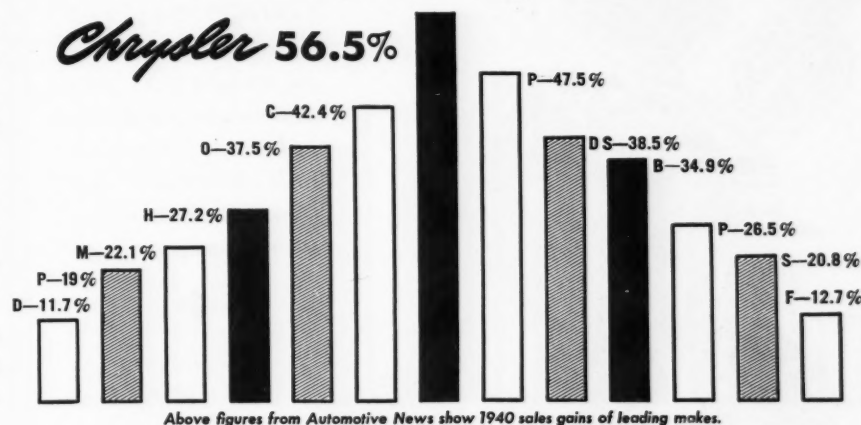
You get the good things first from Chrysler every year...so your line is always competitive, aggressive, growing in popularity.

All over the country, owners of *new 1941 cars* have traded them in to get *Fluid Drive* and the other great Chrysler features. Chrysler has attracted new owners at the fastest rate in history!

With Chrysler and Plymouth, you cover the market. However conditions change in your territory,

you're always ready to take advantage of them.

Naturally, the tremendous increase in sales has made a big 1941 expansion program necessary...so there may be an opportunity near you. If interested, address Chrysler Corporation, Chrysler Sales Division, 12200 East Jefferson Avenue, Detroit.



MAKE MONEY WITH

CHRYSLER AND PLYMOUTH

BATTERY PERFORMANCE

(Continued from page 25)

owner buys a battery from us, we guarantee to get him rolling if he has starting trouble anywhere in town or within reasonable distance. We vary the argument at different seasons. In winter, we stress the inconvenience of having the battery go dead just as he is about to start for work, or as his wife on a cold morning is ready to take the children to school. In summer, we point out that the same thing may occur when he is trying to get away to an

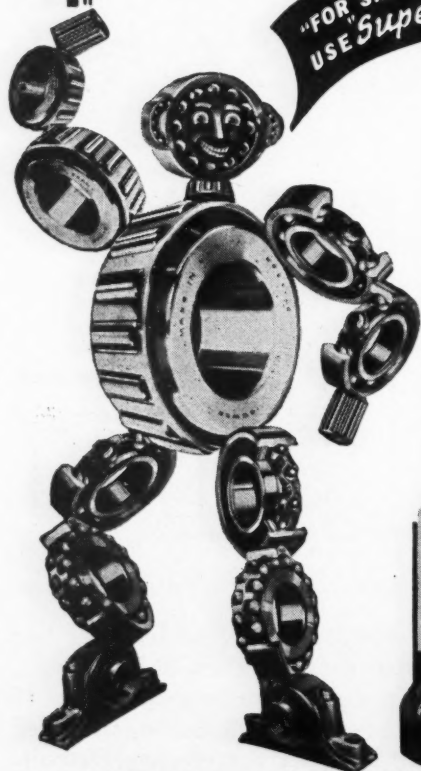
early start on a long vacation trip.

"We can and do make good on our promises. We're open from 7 o'clock in the morning till 10 at night, so we're on the job during the hours when most battery failures occur. When a customer finds himself unable to get out of the garage, we send out a rental and get him started. Then we bring the battery in to see whether it is at fault. If it's O. K., we ask the owner to bring his car in for a check.

INSURE the easy, quiet performance of original equipment by replacing rough bearings with Bower Tapered Roller Bearings . . . "Super-Finished" to 3 micro-inches for finer adjustment and greater load-carrying capacity.

Two-zone contact of roll ends with high flange, unsurpassed smoothness of surface finish and other exclusive Bower features put a stop to bearing troubles, eliminate "run-in" and finally guarantee your good work.

"FOR SMOOTH PERFORMANCE, LONGER WEARING, USE 'Super-Finish' BOWER ROLLER BEARINGS"

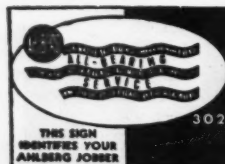


Bower "Super-Finish" Tapered Roller Bearings are an important part of your Ahlberg Jobber's unique "All-Bearing" service. Call him for prompt supply.



**Ahlberg
JUNIOR
Front Wheel
Bearing Service
Salesman**

for counter, bench or wall. Carries advertising, fast moving stock of Bearings, genuine Croft knockout tool and Croft packer.



Ahlberg Bearing Company

Manufacturers of CJB Master Ball Bearings
302B WEST 47th STREET — CHICAGO — 30 WAREHOUSE BRANCHES
Out West at PRECISION BEARINGS, INC. Los Angeles

"Of all the points we can make, this emphasis on road service sells more batteries than any other. Cheap competition can't possibly answer it. It's so powerful we close 98 per cent of the sales we attempt."

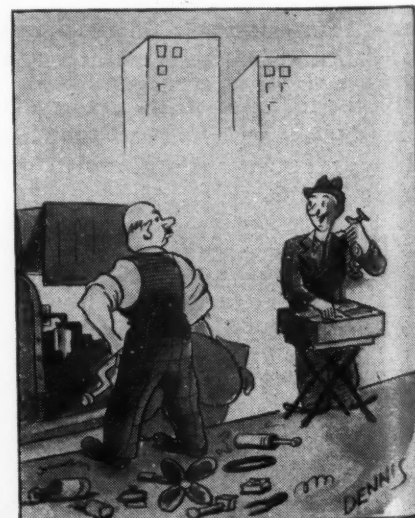
The station does not, however, depend solely on this selling argument. It lays great stress on the importance of buying a battery built, not to sell at a bargain price, but to handle without interruption the man-sized job imposed on it by the modern automobile. That means talking product, and the Tacconnelli shop talks it at every opportunity. In doing so, it uses two important aids.

First is a pair of cut-away batteries, one a first-line unit sold by the shop, the other a low-priced competitive make. On the latter, the customer is shown the composition case, the inadequate separators, and in particular the thin plates of inadequate area. Then, on the standard battery, he is shown the molded-rubber case, the high-quality separators, and the thick, full-sized plates.

Besides the cut-away units, the shop uses the special display stand supplied by the manufacturer of the battery it sells. This carries charts on the various types and sizes of batteries sold by the shop, and compares the data on performance and life of these units with those on cheaper batteries. In this way, the customer is shown exactly how much battery satisfaction he is buying per dollar.

When the Tacconnelli shop does fail to convince the customer that the higher-priced unit is the wisest buy, it is often because the owner is about to trade in his car. Such customers are sold a low priced battery carried by the shop to meet just such a situation.

Selling new batteries is always uppermost in the minds of everyone connected with battery service in the shop. Careful record is kept of the



"Buy a puzzle, buddy? Special two for a dime."

condition of batteries in customers' cars, and, where possible, of their age. As soon as the battery is old enough or weak enough to make a sale likely, the customer is sounded out on the idea of buying a new one. He does not always take up the suggestion the first time it is made, but usually does when it has been repeated a time or two, together with a warning that the failing unit may leave him stranded.

When a battery sale has been made, the shop is careful to do everything possible to insure its long life and good performance. The generator is checked for output and the voltage regulator and ammeter for condition. Even the starter draw is checked. Only then is the new battery installed.

The shop considers this check necessary to insure customer satisfaction. Besides it is protection for the shop against too-frequent calls for road service. While the shop is able and willing to make good on its promise of free service, it sees no point in inviting demand by placing a new battery in a car on which inadequate generator output or defective wiring makes trouble inevitable.

Tacconelli, therefore, finds the free road service that sells so many batteries for the shop no great expense.

"Today," he says, "a good battery in an automobile electrical system that's in good condition doesn't fail very often. But that doesn't lessen the value of road service. It's always there if the customer needs it. If he doesn't need it, he's even better pleased."

DISTRIBUTORS

(Continued from page 33)

A testing fixture will also permit testing the centrifugal advance and, in the case of double breaker arm distributors, will permit accurate synchronization.

When installing or setting breaker points, it is also necessary to check the spring tension with a spring balance and also make sure that the movable point does not bind on the bushing.

The distributor shaft and bushing must also be checked, for if the shaft or bushing is worn it may result in failure of the points to open or close and consequently a spark miss will result.

Of equal importance is the condition of the distributor cap and rotor. A charred cap or rotor must, of course, be replaced with new parts. In connection with the rotor, the peining of the metal arm in order to reduce the gap and consequent radio interference must be discouraged, for, as soon as there is slight wear in the distributor shaft bushing, the rotor will strike and crack the cap.

While the vacuum advance is not actually a part of the distributor unit, it must also be carefully checked to insure correct operation of the distributor.

MEWA Offers New Service on Preparing Catalogs

MEWA announces establishment of a special Catalog Service at MEWA headquarters to guide and assist automotive after-market manufacturers in building more compact and lighter-weight catalog material for jobbers' use.

William H. Bonney will join the MEWA staff May 1, to take complete charge of this catalog service work.

Bonney has some 25 years' experience in supervising and building jobber catalog material both in automotive and hardware lines. He comes to the association from Beard & Stone Electric Co., Houston, Texas, with whom he has been associated for the past 16 years. He has a complete knowledge of the automotive jobbing field, having worked both as an outside territory man and in the office where he specialized in the building of jobber salesmen's catalogs.

THEY'RE like safety washers on your good work — perfect bearings in place of worn ones turn out a tight, well-lined-up, quiet-running job.

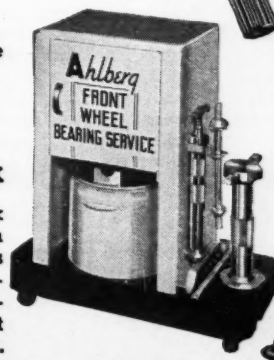
This kind of bearing service — the kind Ahlberg provides — pays! You deal with your Ahlberg Jobber who has exactly what you need when you need it; you get the right replacement promptly; you install it — and customer satisfaction is thereby assured!

**"MAKE YOUR BEARINGS SERVICE PAY...
REPLACE THEM ALL THE AHLBERG WAY"**

Get every ball, roller and thrust bearing you need from your Ahlberg Jobber, one of 800 Wholesalers served by the Ahlberg Factory and 30 Factory Branch Warehouses.

**Ahlberg
SENIOR
Front Wheel
Bearing Service
Salesman
WASHES
DRIES
RE-PACKS
STORES STOCK**

Turns dirty work into a clean profit. Attracts service and replacement business through fast factory-type job.



Ahlberg Bearing Company

Manufacturers of CJB Master Ball Bearings

3028 WEST 47th STREET — CHICAGO — 30 WAREHOUSE BRANCHES
Out West at PRECISION BEARINGS, INC. Los Angeles

VACUUM STARTING SWITCH

(Continued from page 31)

To check the timing of the switch, set the throttle stop screw to give an engine idle speed of 8 m.p.h. when the engine is warm.

Remove the switch cover plate and gasket. Place a mirror so that the guide pin and lock-out lever are visible from the left side of the engine.

Turn the ignition off. Disconnect the throttle rod from the throttle lever to relieve the spring tension, and then open the throttle approxi-

mately $\frac{1}{4}$ in. by hand. With a short piece of wire or a small drill, move the guide pin to its "up" position so that it is held by the lock-out lever, as shown in Fig. 4.

Slowly close the throttle until the lock-out lever releases the guide pin and permits it to drop down on the throttle shaft rotor. This can be seen in the mirror, or usually the "click" made when the guide pin hits the rotor is loud enough to be heard.

Hold the throttle lever at the posi-



"—just as I thought, Mamie—no gas."



HOW TO BE

Lucky at Cars

You pour more than oil into every crankcase you fill!

You pour in your reputation as a serviceman... and your customer drives out and pounds it for a thousand miles or more.

That's why you're safer... and luckier, too... when you recommend PennZoil. Back of PennZoil is an organization pledged to safeguard your reputation, an organization *first* with every worth-while improvement in refining.

Controlled from oil well to crankcase, PennZoil's top quality is the same all over and always

the same. The same PennZoil you can sell your customers is specified exclusively for some of the world's toughest lubrication jobs—Union Pacific Diesel-powered Coast-to-Chicago Streamliners, United Air Lines Mainliner planes, and many others.

You can sell PennZoil confident that its superior quality will show up in better engine performance and economy of your customers' cars. It keeps enthusiastic PennZoil users coming back to you... *insures repeat business.*

Put the name PennZoil and all that's behind it to work for you!

tion it was in when the lock-out lever released the guide pin, and measure the clearance between the idle stop screw and the high point of the idle cam (that part of the idle cam which holds the throttle in fast idle position). This clearance should be not less than $\frac{3}{64}$ in. and not more than $\frac{3}{32}$ in.

If the clearance is less than $\frac{3}{64}$ in., replace the timing washer with one having a higher number—if more than $\frac{3}{32}$ in., replace with a washer having a lower number. The timing washer (shown in Fig. 5) has a square hole in the center to hold it in position on the throttle shaft. The locating lug holds the rotor in position on the shaft. Since the rotor is a press fit on the shaft, this locating lug, being in different positions on the timing washer (depending upon the number stamped on the front side of the washer) controls the position of the rotor with respect to the degree of throttle shaft rotation at which the lock-out arm makes contact.

WHEEL ALINEMENT

(Continued from page 27)

of the tie rod adjustable tubes. These tubes turn in opposite directions—turning the left tie-rod tube toward the front of the car and the right tie-rod tube toward the rear of the car decreases the toe-in; turning the left tube toward the rear and the right tube toward the front increases the toe-in. Turn both adjusting tubes an equal amount to obtain from $\frac{1}{32}$ to $\frac{3}{32}$ in. toe-in. See Fig. 4.

When checking the toe-out on turns, the outside wheel should be set at 20 deg. and the inside wheel should read 21 to $21\frac{1}{4}$ deg. If these readings are not obtained, it indicates bent parts, which should be replaced. It is possible to check the steering arms by measuring from the brake backing plate to the center of the tie-rod socket hole in the end of the arm. This measurement would be $2\frac{19}{32}$ in.

THIS
MONEY-MAKING
INFORMATION IS
FREE!
MAIL COUPON
TODAY!

The Pennzoil Company, Oil City, Pa.

Please send me, without obligation, complete details on ☐ How to Increase Oil Gallonage ☐ How to Get More Lube Jobs ☐ Boost Service Sales.

Name

Address

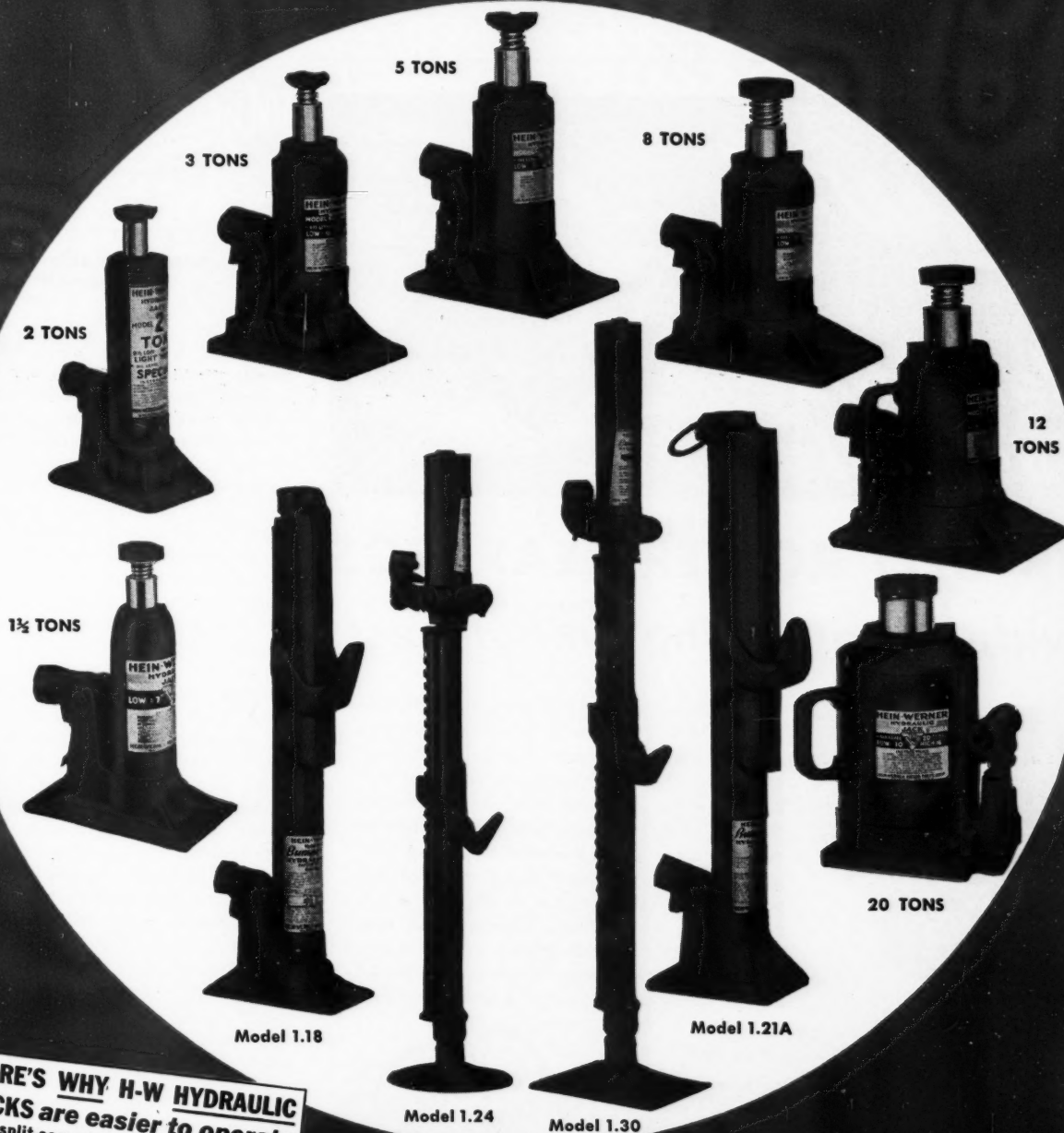
City State

MA-2



IT PAYS to STOCK and DEMONSTRATE HEIN-WERNER HYDRAULIC JACKS

--They're super-powerful, easy-operating--and are priced right



HERE'S WHY H-W HYDRAULIC JACKS are easier to operate

In a split-second, mere finger pressure is transformed into a lifting force of several tons

- 1 Exert a 2 lb. pressure on the end of jack handle "A".
- 2 This causes a 50 lb. downward pressure on piston "C" when "A" is 25 times as long as "B".
- 3 ... Which becomes a 2 1/2 ton upward force on the ram, since the lower surface of the ram has 100 times the area of pump piston "C".

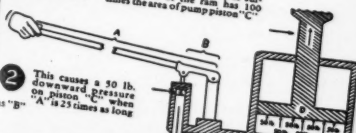


Diagram above shows basic principles of Hein-Werner Hydraulic Jack Power

For years of trouble-free hydraulic jack use, HEIN-WERNER has built 250,000 hydraulic jacks. Now, all you have to do is to push a little handle, and you're done--and 100 LBS. ON TO BUY.

The complete H-W line includes 1 1/2 ton capacity models at only \$2.18... 2 ton model, \$3.25... 3 ton model, \$7.35... 5 ton, \$9.45... 8 ton, \$12.50... 12 ton, \$18.00... 20 ton, \$30.00. All prices are net to dealer, and all carry highest West Coast.

Hein-Werner also makes Burrow-Lift Hydraulic Jacks for power use, and a full line of Service Jacks of 1 1/2, 2, 3 and 4 ton capacity. Also, etc.

Ask your H-W dealer for details--or write us

HEIN-WERNER MOTOR PARTS CORP.

Westfield, Massachusetts

GM Employees' Report Reveals Big Wage Gain

A call to the approximately 250,000 employees of General Motors—"to contribute all we can to this great national effort for a strong America"—is sounded by Alfred P. Sloan, Jr., chairman, and C. E. Wilson, president of the corporation, in the third consecutive annual report to General Motors Employees. "We in General Motors are pledged to meet to the best of our ability whatever new responsibilities we may be asked to assume" in connection with the national

defense program, the employees are informed.

The annual report to employees for 1940 takes the form of a 20-page booklet illustrated with pictures, charts and pictographs.

In a review of the 1940 operations, the report gives credit to the entire organization for the good showing made in 1940, when dollar sales of all GM products increased 30 per cent over 1939.

The report also points out that "the increased volume of orders in 1940 meant more work to be done—more jobs in our plants and more



LINK-BELT ROLLER BEARINGS Provide Long Lasting Smoothness!



The exclusive convex-concave roller principle of Link-Belt Shafer roller bearings offers you many performance extras that are not found in ordinary bearings. They run smoother and last longer because their basic design provides compensation for wear. Ask your jobber to explain this—you'll discover something that will help you put many more miles of top performance into every car or truck in which you replace front wheel, differential or rear axle bearings. If your jobber doesn't carry Link-Belt Shafer Roller Bearings—write us for the name of one near you who does! 8507

LINK-BELT COMPANY

519 N. Holmes Ave., Indianapolis, Indiana
Warehouses in all principal trading centers
Made by the makers of the famous
Silverstreak Silent Timing Chain!

LINK-BELT
SHAFER
ROLLER BEARINGS

FOR
FRONT WHEELS
DIFFERENTIALS
AND
REAR AXLES



"It all started over an argument about a crankshaft"

hours of work as well. Wage payments moved up as business improved—moved up to an all-time high." The result was that wage payments in United States plants rose \$93,404,000 to \$357,253,000, an increase of more than one-third over 1939. In addition, the 1940 average weekly earnings of regularly employed hourly-wage employees in all GM plants in the United States were 20 per cent higher than in 1939. As a result, average annual earnings of these employees amounted to \$1,804 last year as against \$1,503 in 1939.

Other sections of the report deal with such subjects as are indicated by these headings: There Were More GM Folks in 1940; Taxes Reach Record High; 398,000 GM Owners; Research Builds for Tomorrow; GM Folks Work Safely, Guard Against Uncertainties (dealing with plant safety records, healthful working conditions and employee benefit plans); Our "Know-How" with Tools—U. S. Asset.

Under the last heading is this explanation: "American productive might, never equaled elsewhere, is to a large extent the result of industry's success in steadily developing better ways of doing things. Today this 'know-how,' this familiarity with the latest production techniques, is an invaluable national asset in preparing America's defensive strength."

In concluding the report, Messrs. Sloan and Wilson declare: "The record demonstrates that skill, experience and, above all, ability to work together, are an unbeatable combination. Our usefulness to the country—and therefore our usefulness to ourselves—will increase as we find ways of applying this combination still more effectively."

GET YOUR MIND ON YOUR WORK, NOW,
AND TELL THESE PEOPLE THAT JUNE 21ST
IS THE DATE OF THE NEXT COLLIER'S P.S.
ISSUE. (ON NEWSSTANDS, JUNE 13TH). REPRINTS
ARE READY RIGHT NOW FOR WIDE-AWAKE
DEALERS. REMEMBER-- COLLIER'S TELLS
WHY. IT'S UP TO DEALERS TO TELL WHERE!

For Summer Driving

You'll do in the heat that's ahead, a pre-summer tune-up is particularly vital.

The temperature inside the engine of an automobile is hotter than the hinges of hell—what? But your engine must not be allowed to run a fever.

You have a radiator water-cooled system in your car to help maintain normal temperature. It is the cooling system. During each minute the engine is running, 70 gallons of water should rush through the radiator, be cooled by the air the fan sucks through the radiator, and then return to the hot engine. There is a pump, driven by the fan belt, to keep the flow of gallons up to par.

It is to do its duty, your cooling system—which includes hose connections and thermostat as well as radiator, pump, fan and fan belt—must be clean, tight and in all-around perfect order. Because, obviously, it is more difficult to keep an engine cool in summer than during the cold winter weather. So a cooling-system check-up should be made now.

Now, Here's Real Heat!

The cooling system is designed to dissipate a tremendous amount of heat. For instance, the hottest end of the spark plug gets close to 1400 degrees Fahrenheit at 60 miles an hour. And the heat has to get out a second to pass off through the porcelain, body and gaskets of the cooling system. Any delayed action here would run up your engine's temperature before the point where the cooling system can compensate.

Similar extremes of heat occur in other parts of the engine. And similar splatters and relief from it must take place if you are to avoid overheating. Spark plugs, valves, manifold, valves, distributor and injector should all be scientifically inspected and adjusted by your service man in order to get your car ready for summer.

Lubrication Does More Than Save Wear

Combustion, however, is only one source of heat. Its twin brother is friction. When your car travels forward at 40 miles an hour, each piston makes more than 2,000 up-and-down round trips an hour. Unless you have enough oil of the right quality in your crankcase, excess friction will develop. Friction produces heat—the kind of heat that burns out bearings, causes pistons to "seize," and otherwise plays havoc with a good engine.

Be sure you have the correct summer-type oil for your car... keep it up to the correct level at all times... and always keep it clean by replacing the oil-filter element when necessary.

Regular chassis lubrication is important during the summer months, too. Also have your service man check the type and amount of lubricant in the transmission, clutch, front-wheel bearings, universal joints and all other lubricated parts.

Look At Your Tires

With the problem of engine heat well in hand, turn to your tires and tubes. Trouble with them was once the most frequent of summer complaints. And while they now cost less and give you more trouble-free service than they did ten years ago, you've

still got to give them Preventive Service in hot weather. Check for weak spots and signs of baldness. Have your wheels aligned to prevent wasteful wear. And keep your tire pressure at the point recommended for your car. Incidentally, check the pressure when your tires are cool. These pointers are the springboard of Preventive Service for summer. You'll find more in the booklet *Collier's* offers. Take advantage of them and of your service man's knowledge and willingness—and here's to a swell time this summer!

Send for the booklet "Operation and Answer to Turn-up for Summer Driving." It tells you the inside story of your automobile. Enclose 6 cents to cover cost of handling and mailing. Address: Preventive Service, Collier's, 250 Park Ave., New York City.

TEST
YOUR LIGHTS
AND WIPERS

PROTECT
THE
FINISH

CHECK
WHEEL
ALIGNMENT

CHECK
YOUR BRAKES
AND
TIRES

CHECK OIL,
LUBRICATION
AND FILTERS

P.S.
PREVENTIVE SERVICE
Sponsored by Collier's
for Motor Car Owners



Army Officers to Receive Training on Maintenance

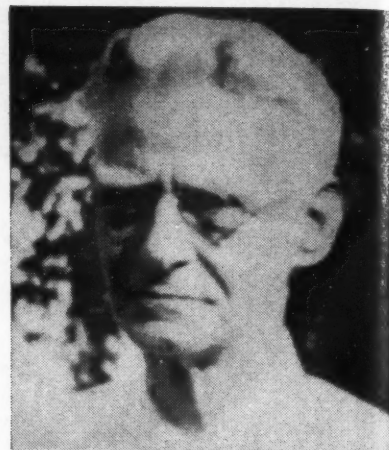
Approximately 1000 commissioned U. S. Army officers will be trained by Chevrolet in the repair and maintenance of the new 4 x 4 army trucks which the division has been building for the Army since last fall. Fifteen officers are enrolled in the initial school at Chevrolet which began April 14.

Under the direction of Ed Hedner, national director of service for Chevrolet, a series of weekly schools will be held throughout the next eight

months. After the original class, enrollment will be doubled so that eventually nearly 1000 officers will have been trained. These men, in turn, will instruct non-commissioned officers in their respective camps and they will be in charge of mechanic instruction among enlisted men and draftees.

Joins Chicago Pneumatic

Chicago Pneumatic Tool Co., New York, has engaged the services of James P. Gillies to assist in general sales activities. Gillies is well-known in the business world.



H. A. Pedrick

Howard Ashley Pedrick

Howard Ashley Pedrick, inventor of the process of imparting tension to piston rings by heat, died March 5 at the home of his daughter, Mrs. George Ebert, State College, Pa. He was 78.

Pedrick's invention was patented and is known throughout the automotive trade today as the heat-shaping process, one of the major features characterizing the piston rings which bear his name.

Nearly 50 other patents were granted to Pedrick. One of these was the basic patent for stopping and starting by variation of air pressure. This invention is incorporated today in all air brakes on trolley cars, buses, railroad trains and on all other mechanisms with pneumatic control of starting and stopping.

Beckenbach to Head

Cleveland Association

At a meeting of the board of representatives of the Cleveland Automotive Trade Association April 17, the following officers were formally elected for the new fiscal year:

President, Homer R. Beckenbach, Lake City Sales Co.; 1st vice-president, Jay W. Barber, Barber Motors, Inc.; 2nd vice-president, I. S. Brownlee, Brownlee Chevrolet, Inc.; treasurer, W. O. Steudel, Steudel Motors, Inc.; secretary, R. Earl Burrows, Cleveland Automotive Trade Association.

R. Earl Burrows was retained as manager, and elected as secretary for the year.

Named Regional Manager

The appointment of J. W. McLaughlin to the post of manager of the Oklahoma City Region of Dodge is announced by Forest H. Akers, Dodge vice-president and director of sales. McLaughlin has been on the company's headquarters sales staff for the past 12 years, for the last three years in the capacity of manager of used-vehicle merchandising.

SEND THESE PUPS AFTER THE



Sell MONEY-SAVING Service! USE this Sales Story—Nationally Advertised in Collier's—to bring you "After-Anti-Freeze" Business!

1. EASY to DEMONSTRATE—Warner Cooling System Products can give you quick, simple selling demonstrations to show your customers what happens in the cooling system... to show why they need your service.

2. EASY to SELL—You sell Warner Cooling System Products by (a) reminding customers of the importance of proper cooling; and (b) reminding them how Warner products are engineered for TODAY'S automobiles.

3. EASY to MERCHANDISE—You can use Warner Cooling System Products to open sales on ALL your service and merchandise for the cooling system... such as radiator hose, fan belts, etc.

4. COMPLETE PLAN—You can have a copy of "Profitable Cooling System Service" FREE. It's a complete book of proved, practical plans... to help you turn "free water" into PROFITS on cooling system service.

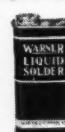
THOROUGH CLEANING

Clean Out... the oil muck, scale and sludge... that can ruin the cooling efficiency. When the anti-freeze comes out—sell Warner Radiator Cleaner... specially prepared, thorough and SAFE for automobile cooling systems!



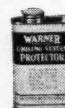
PERMANENT REPAIRING

Stop Leaks... permanently, quickly, SAFELY... in the radiator—or even in a cracked motor block! Sell Warner Liquid Solder, specially engineered to maintain cooling efficiency in Today's automobiles. The standard for more than 20 years!



POSITIVE PROTECTING

Protect... cooling efficiency with Warner Cooling System Protector. Prevents rust and corrosion. Keeps cooling system walls clean! Since all water causes rust—and since warm weather driving causes more rust—every car needs this important protection.



PROFITS are there NOW! Your customers are reading the National Advertising on Warner Cooling System Products right NOW! Sell them now... while they're ready to buy!

WARNER-PATTERSON COMPANY, 920 South Michigan Avenue, Chicago, Illinois



HERE'S WHAT YOU'VE BEEN WAITING FOR:

THE MOTOR THAT

"Doubles in Brass"

NEW ALEMITE ADVANCE LINE MOTOR

MOVED EASILY FROM PUMP TO PUMP

Twist! Lift! And the Alemite Advance Line Motor is ready to work on another pump! Keeps investment down, efficiency up!

ONLY \$59.95*
or 8.4¢ per day Payable Monthly

ONLY \$44.25*
or 6.2¢ per day Payable Monthly (with power head 8.7¢ per day)

HERE'S *guaranteed performance* you've never seen matched in any other line of service equipment! A complete line of pumps, operating direct from 25, 35, or 50-lb. containers—air-operated high pressure and low pressure units to give you exactly what you need in modern equipment with an absolutely rock-bottom investment! *And here's the really amazing news:* You can operate as many Alemite Advance Line Power Units as you wish—with *only one powerhead!*

Like the versatile bandsman who plays many instruments, this Alemite Advance Line Motor "*doubles in brass*"—lifts easily from one pump to another with a simple "*twist of the wrist*"—saves tying up your money in motors you don't need!

Get all the details now! Of course you can use the convenient Alemite *Pay-as-you-profit* plan to further reduce your original outlay! With this set-up, the most modest shop can have complete modern Alemite Equipment—and *make a handsome profit on it!*

*Slightly higher west of the Rockies

STEWART-WARNER CORPORATION
1851 Diversey Parkway, Chicago, Illinois



ALEMITE

REG. U. S. PAT. OFF.

Business Breaks Record at Annual Tri-State Show

The seventh Annual Tri-State Automotive Industries Show was held April 1-2-3-4, at Hunt Armory, Pittsburgh, Pa. Seventy-three manufacturers occupied 146 booths, and 19 heavy equipment spaces.

Attending as guests were 146 jobbers from Pennsylvania, Ohio, and West Virginia, and 10,126 dealers, garagemen, service operators, fleet, and industrial firms.

Reports from manufacturers indicated that the volume of business

written was in excess of any previous show held in Pittsburgh. Dealers and jobbers placed orders for practically all types of equipment.

Heads Executives Club

Albert J. Proctor, who completed this week his 29th year of continuous service with AC Spark Plug division of General Motors, was recently elected president of the Flint Industrial Executives club at the annual dinner meeting of the club at Hotel Durant. The office of president rotates each year. Proctor is an AC superintendent and is the division's oldest employee.

Sasnett Heads Atlanta Sales for Wayne Pump

The appointment of B. H. Sasnett as district manager in the Atlanta territory has been announced by E. J. Gallmeyer, vice president and director of sales of The Wayne Pump Co.



B. H. Sasnett

Sasnett, who has been with the company for a number of years, succeeds A. A. Grossman, who died Feb. 19. Sasnett brings a splendid background and training to his new position and is widely known in the industry in the Southeast.

Nash First Quarter Sales Establish All-Time Record

Sweeping public approval of the new car with which Nash Motors entered the lowest-price automobile field a few months ago has brought the company the biggest sales in its 25-year history and established a new all-time first-quarter sales record, it was revealed today by W. A. Bles, general sales manager, Nash Motors Division, Nash-Kelvinator Corp.

Bles said the company's January-February-March business throughout the U. S. was twice as great as a year ago, and surpassed the all-time record for the period by a wide margin.

During the first quarter, he said, the company's dealers delivered 26,193 new Nash automobiles to customers, as compared with deliveries of 13,070 new cars in the first three months of last year, and the best previous record of 23,699 units, set in the first quarter of 1929.

REGROOVING TIRES

(Continued from page 36)

inclined to get the maximum service from their tires before replacing them, and this will open up a larged field for tire regrooving.

Furthermore, if new car production is curtailed to make way for production of national defense material, as it was during the last war, used cars will find a more ready market. Used-car buyers will not be less critical of the condition of the car, however, and will expect a reconditioning job that will give them satisfactory service. Many car dealers are finding that it pays to regroove the tires on the lower-priced used car. Regrooving not only adds to the general reconditioned appearance, but provides that element of safety which is of major importance from the buyer's angle.



More POWER! More SPEED! More FEATURES!

Van Dorn's New Heavy Duty Wet-Grinding Valve Reconditioning System is a "package" containing everything you need for bigger profits on valve jobs. Here's what the Heavy-Duty System includes:

VALVE RESURFACER with larger motor — more power, increased speed — grinds any valve from a Bantam to a

Diesell! Special attachment wet-grinds mushroom type stems.

VIBRO-CENTRIC VALVE SEAT GRINDER. New angle head reaches back valve seats. More power to turn out jobs quickly, profitably.

CABINET is smart-looking, has adjustable lamp, easy opening drawer, roomy storage space.

Ask your Jobber for a demonstration. Write for FREE copy of new "Valve Reconditioning Handbook" to Van Dorn Electric Tools, 727 Joppa Road, Towson, Maryland.



"Van Dorn"
(DIV. OF BLACK & DECKER MFG. CO.)

THE "RED HEADED" PORTABLE ELECTRIC TOOLS



IN PUBLISHING...

consumer goods than is offered in any other magazine — ably complementing the out-and-out editorial information that is so readily absorbed from LIFE. That is the big reason why passenger car advertising in LIFE has increased more than 500% in the past two years.

*Scientifically established and reported by LIFE's Continuing Study of Magazine Audiences. Latest audience totals, from Report No. 4:

COLLIER'S	14,750,000
LIBERTY	12,900,000
LIFE	20,450,000
SATEVEPOST	13,050,000



Frank Gause

Frank Gause, secretary of The Four Wheel Drive Auto Co., since the formation of the corporation in 1910, died April 2, of a cerebral hemorrhage.

Gause was 71 years old. He was born at Lake Mills in Jefferson County, Wis., Feb. 6, 1870. He studied telegraphy and came to Clintonville in 1890 as an operator in the depot for the Chicago and Northwestern Railroad. In 1892 he married Stella Pearl Stimson, of New London, who survives him.

On July 14, 1910, Gause was elected

secretary of The Four Wheel Drive Auto Co., and served as secretary without pay for a year.

He served the community for seventeen years as city clerk and was a director of the former Clintonville State Bank, and the former First National Bank of Clintonville.

Elected by Body Firm

E. E. Miller has been elected vice-president of the De Kalb Commercial Body Corp., of De Kalb, Ill.—an organization producing standard and custom built commercial truck bodies.



MORE GREASE JOBS FOR YOU ...

WHEN YOU SELL-EBRATE OUR DIAMOND JUBILEE

Valvoline's 75th Anniversary—the first in lubricating oil history—means not only more premium oil business for our dealers, but more lubrication jobs as well.

With Valvoline "X-18", first all-season, all-purpose gear lube, you meet every car's needs. One lubricant replaces eighteen different gear lubricants. You're never "out" of the correct grease—never "loaded"

with lots of seldom used lubricants. Each lubrication job means greater profit, assured satisfaction.

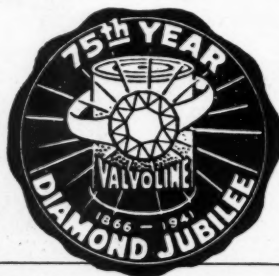
IT'S OUR PARTY!

You can win swell prizes on Valvoline Motor Oil sales—plus extra profits from extra business—by helping to SELL-EBRATE the Valvoline Diamond Jubilee. Act Now! For full details write or wire today.

VALVOLINE OIL COMPANY

540 East 5th Street, Cincinnati, Ohio

New York — Chicago — Atlanta — Los Angeles
Refinery in Pennsylvania



COSTS MORE TO MAKE

— COSTS LESS TO USE



"I'm a stranger here, officer, where do I get this ticket fixed?"

PLANE ENGINE

(Continued from page 46)

The induction system will have solid injection with an injector for each cylinder, timed to discharge after the charge of air has been fully compressed. This arrangement affords good mixture and distribution, permits of better cooling due to the sweeping action of the incoming air during the exhaust stroke.

The engine is fully supercharged, using an exhaust turbine with a centrifugal compressor and an integral intercooler. Although there is no mechanical connection between the supercharger and the engine, all the mechanism is designed for unit mounting so as to simplify the installation problem on the part of the aircraft producer. Operation of the turbine is controlled by means of a "waste" gate in the exhaust system, a damper which regulates the percentage of exhaust through the supercharger. The unit provides sea level manifold pressure up to an altitude of 32,500 feet. It is of interest to note that, according to preliminary estimates, the supercharger takes 100 hp. at take-off, 440 hp. at an altitude of 32,500 ft., the power being drawn from the exhaust system.

Output of Tools Is Tripled in March by McKenna Metals

Shipments of Kennametal carbide tools and blanks were three times as great in March, 1941, as in October of last year, according to an announcement by Philip M. McKenna, head of the McKenna Metals Co., Latrobe, Pa.

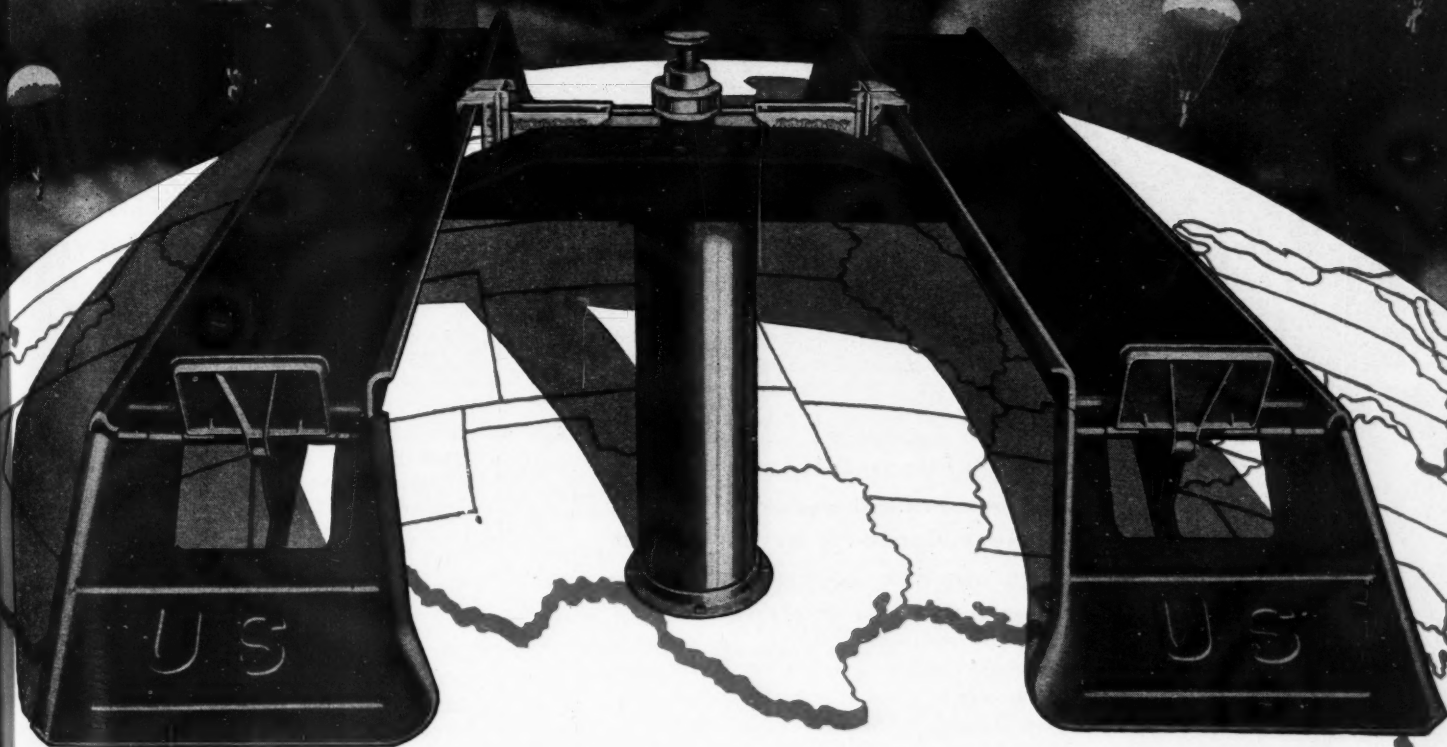
Plans for expansion have been made which will again double the plant's production by June, 1941.



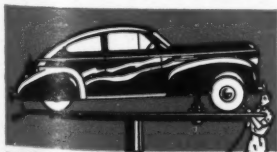
*First
with*

FLOATING BODY

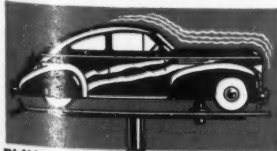
LUBRICATION



Soaring to New Heights with Modern U. S. Lubricating Equipment



Pitlift Jumping Jack raises and holds car 5 inches, freeing chassis bearings during lubrication. Ideal for changing tires, repair work, re-packing front wheels, etc.



Pitlift Jumping Jack automatically bounces car up and down allowing lubricant to cover every part of springs, spotting and silencing all squeaks and groans and working lubricant in and around fittings.

U. S. Floating Body Lubrication is far above ordinary methods of lubrication because it actually gets the lubricant to every part of the fittings, bearings and springs and does it fast, efficiently, thoroughly and without any effort. This remarkable combination consists of U. S. "Tailor Made" Full Hydraulic Drive-on Lift mounted with the two-purpose Pitlift Jumping Jack which raises body and automatically bounces car up and down continually. Complete accessibility above with plenty of elbow room to work.

U. S. Floating Body Lubrication is the fastest, most thorough, and easiest way of properly lubricating a car—a modern method for modern cars.

Complete U. S. merchandising plan can be had on Floating Body Lubrication at a nominal charge consisting of mailing cards, attendants' buttons, banners and newspaper mats.



AIR COMPRESSORS * GREASING EQUIPMENT * HYDRAULIC LIFTS

A. P. Fox Elected President of Lincoln Engineering Co.

The board of directors of the Lincoln Engineering Co., at their annual meeting elected Alex P. Fox as president. He will take over the duties of Frank S. Barks, deceased. Fox becomes the third president to serve the company during the past 30 years. C. H. Howard, late president of the Commonwealth Steel Co., who preceded Barks, resigned in 1916.

Fox was formerly vice-president and treasurer and has been associated with the company 28 years, be-

ginning his career as a draftsman in 1913 when the factory was located at Valley Park, Mo. The solid financial growth, and much of the subsequent expansion of the company, now located in St. Louis, can be credited to the sound policies established by Fox. He has numerous inventions to his credit, having been for many years in active charge of engineering and production.

Officers of the company who were re-elected are Foster Holmes, vice-president in charge of sales; Jonathan Kludt, vice-president in charge of production; G. J. W. La Rue, secretary. L. C. Rotter, chief engineer, was elect-



Alex P. Fox

ed a director at the annual stockholders' meeting to fill the vacancy brought about by Barks' death.

Free Indianapolis Tickets Offered Letter Writers

Free admissions to the Indianapolis Speedway for the Memorial Day Grand Prix race are the prizes offered by the Bear Manufacturing Co. to the five owners or operators of equipment made by the company who submit the five best letters on the subject "What Bear Service Has Meant to Me" or "What Bear Service Has Meant to My Business." In addition to grandstand tickets for the race, winners will receive garage passes so they may inspect the racing cars on May 28 and 29.

Letters must contain not more than 500 words. Only one may be submitted from a shop. Each must be accompanied by a photograph of the interior of the department housing the Bear equipment and by a photograph of the letter writer. Letters should be addressed to Will Dammann, president of the Bear Manufacturing Co., Rock Island, Ill., and must be postmarked not later than midnight, May 8, 1941.

Perfect Circle Replacement Sales Set All-Time Record

The Perfect Circle Co. reports that its March replacement sales of piston rings were 50 per cent ahead of March last year, setting an all-time record for the month.

Triple Action sales in March were 76 per cent higher than in February, and the latter month was 83 per cent ahead of January.

For the first quarter, replacement sales exceeded sales in the corresponding period of 1940 by 17 per cent.



FROM the same engineers who produced the first steel-backed, insert-type engine bearings, comes the new MICRO Bearing—

- a triumph of bearing research and precision production
- another great advance in bearing life and performance

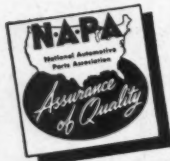
The Monmouth MICRO Bearing is the same bearing so widely used as original equipment in the new 1941 cars—gives double the fatigue life of heavier babbitted bearings.

Now available from Monmouth, through NAPA Warehouses and associated jobbers for motors in which it is being used as original equipment. For engine bearings—*Monmouth is the Name!*

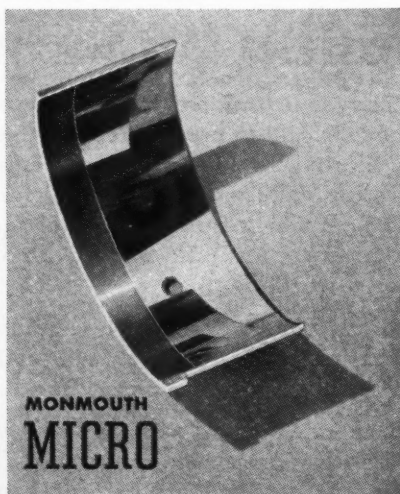
MONMOUTH PRODUCTS COMPANY, CLEVELAND, OHIO, U. S. A.
ENGINE BEARINGS • CLUTCH PLATES AND CLUTCH PARTS • KING BOLT SETS

The bearing metal on the Monmouth MICRO Bearing shown here has been cut away from the steel back to attempt to show the thin babbit lining—only .003 to .005 inch thick, as compared to .012 to .015 thickness in the conventional insert type bearing.

Overall thickness is the same as in the conventional bearing, a heavier steel strip being used to back up the babbit lining. Steel is of premium quality, held to a tolerance of .0005 inch on thickness.

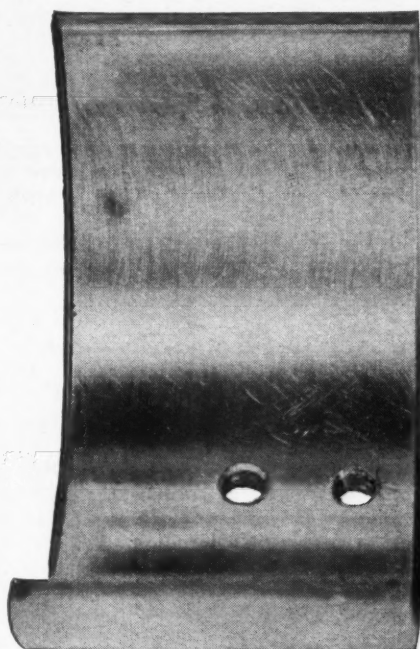


Master stocks of Monmouth Engine Bearings are maintained in NAPA Warehouses from coast to coast, assisting hundreds of jobbers in every section of the country to give prompt service even on rarely called-for numbers.



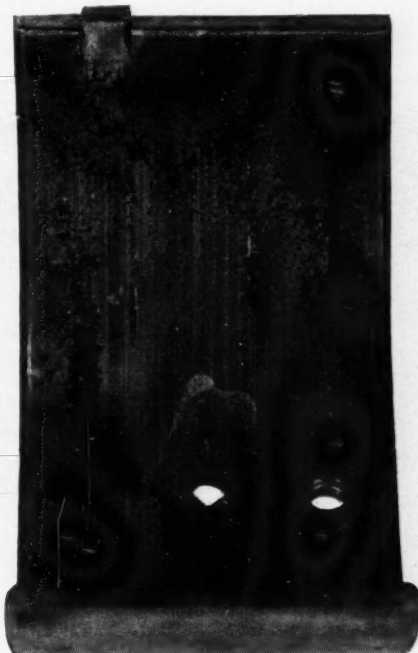
This Testimony Has a BEARING ON THE CASE

Three unretouched photographs of connecting rod bearings from a series of bearing corrosion tests, using three nationally sold, popular brands of motor oil.



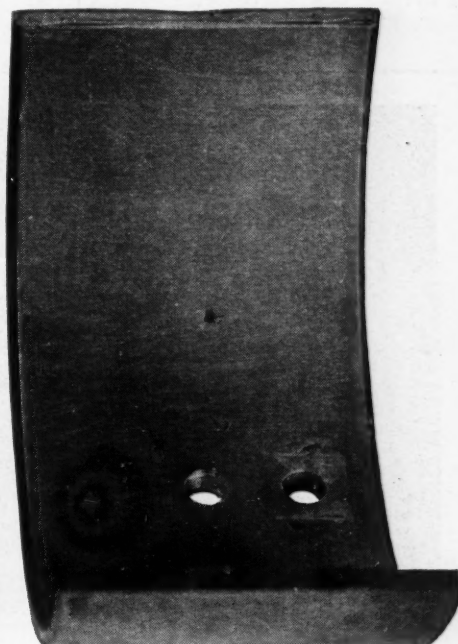
ACID CORROSION . . . NO SIGN

Comparative test made with Stabilized Quaker State Motor Oil; no sign of pitting or corrosion . . . Bearing metal is still practically as good as when new.



ACID CORROSION . . . PLENTY

Comparative test made with a nationally sold 30¢ motor oil, which tends to be acid-forming . . . Bearing metal is dangerously pitted and corroded.



ACID CORROSION . . . TRACE

Comparative test made with a nationally sold 25¢ motor oil . . . Fair corrosion resistance, but other tests showed heavy deposits of varnish and sludge.

● As you know, when a motor oil oxidizes, many things can happen! Sludge, varnish or acids can form in harmful quantities. Quaker State has developed a way to remove the unstable elements in motor oil . . . elements responsible for oxidation, for nearly all varnish, sludge and corrosion deposits. And the New Stabilized Quaker State is a cleaner, more efficient and safer motor oil.

Your recommendations of the New Stabilized Quaker State Motor Oil will rank you as a merchant who is sincerely interested in the welfare of his customers. Quaker State Oil Refining Corporation, Oil City, Pennsylvania.



The New STABILIZED QUAKER STATE MOTOR OIL

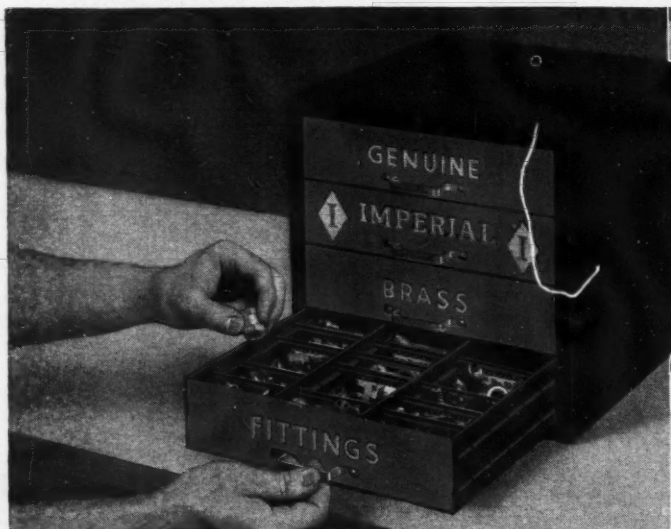
Dr. Midgley Honored By Chemical Society

The Priestley Medal, highest honor bestowed by the American Chemical Society, was awarded at the Society's 101st meeting in St. Louis, Mo., to Dr. Thomas Midgley, Jr., of Worthington, Ohio, for outstanding achievement in chemical science.

Doctor Midgley, who is vice-president of the Ethyl Gasoline Corp., New York City, and chairman of the board of directors of the American Chemical Society, discovered tetra-ethyl lead as an antiknock agent for gasoline and

is known for his work on refrigerants used in air conditioning. He is 51 years old and a graduate of Cornell University. He holds the Nichols Medal of the Society's New York Section, and the Perkin Medal of the Society of Chemical Industry. The honorary degree of doctor of science was conferred upon him by Wooster College.

Following the Detroit meeting of the American Chemical Society in September, 1940, Doctor Midgley was stricken with infantile paralysis from which he is said to be recovering. Despite his disability, he participated



The finest **FREE** cabinet ever offered goes with this new **IMPERIAL BRASS** **FITTING STOCK**

HERE is the finest and most practical stock of brass fittings ever developed for work on gasoline, oil and vacuum lines on cars, trucks, buses and tractors. With this inexpensive cabinet stock any shop can handle at least 85 per cent of all the jobs that come in. It has all the different types of fittings and shut off cocks to handle an extremely wide range of tubing connection work.

The substantially built steel cabinet finished in orange, black and white is 10½" high, 11" wide and 12" deep. The drawers have a total of 92 adjustable dividers each of which has a holder for a cardboard label—thus the entire stock can be easily rearranged in compartments of different sizes. Thus if you want to start with a small stock and build it up this adjustability will simplify the job.

THE IMPERIAL BRASS MFG. CO., 1217 W. Harrison St., Chicago, Ill.

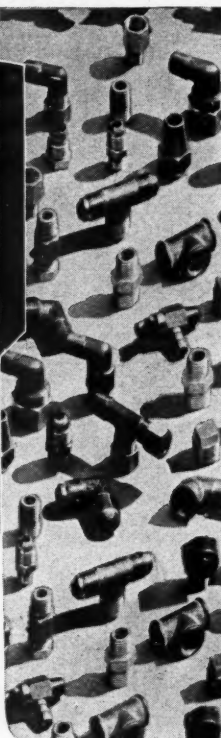
Three different stocks are available as shown by the listings below—

	424-FA	424-FB	424-FC
List Price	\$13.76	\$25.00	\$44.22
Dealer Price ...	7.95	11.65*	18.85*
No. of Fittings	118	182	236

*A \$4.50 cabinet is furnished free for this stock. For the No. 424FA stock \$1.07 is added to the net price of the fittings to cover part of cabinet cost.

With every fitting in this cabinet you get these plus values: No skimping of materials. Imperial Fittings have thicker walls to assure greater strength. They have full length pipe threads. Uniform mixture in all castings. Tees and elbows have flats for wrench.

Pick out the stock that suits your requirements and order one from your Jobber.



"Now here is a new feature, found only in the new cars. It's good if you've got a grudge against cops."

in the St. Louis sessions of the society and is actively directing research.

Meyer Is Elected President of Brooklyn Dealer Group

William Meyer was reelected president of the Brooklyn and Long Island Automobile Dealers Association at a recent meeting of the board of directors. D. B. Spielman, E. J. Lalmant, and H. L. Van Scoy were named vice presidents, W. B. Jones, treasurer, and J. P. Sonner, secretary. Directors elected were: Kings County, C. M. Bishop, N. Cohen, P. J. Flood, F. A. Gehrhardt, and D. B. Spielman; Queens County, M. L. Habrich, William Klaess, William Meyer, J. E. Nachman, and A. P. Neville; Nassau County, William Foggitt, D. W. Kastner, E. J. Lalmant, and A. M. Place; Suffolk County, L. W. Behan, H. D. Newins, M. J. Parlato, C. E. Vail, and H. L. Van Scoy.

Engine Rebuilders Group to Convene at Pittsburgh

The nineteenth annual convention of the Automotive Engine Rebuilders Association will be held at the William Penn Hotel, Pittsburgh, Pa., May 22 to 24, inclusive.

Among the speakers will be George Snook, Hastings Manufacturing Co., who will discuss important business problems of the day, A. G. Defs, McQuay-Norris Co., who will talk on the future of the industry, and Victor Allen, of Ammco, who will discuss equipment from the standpoint of both manufacturer and jobber.

Will Assist Hoffman

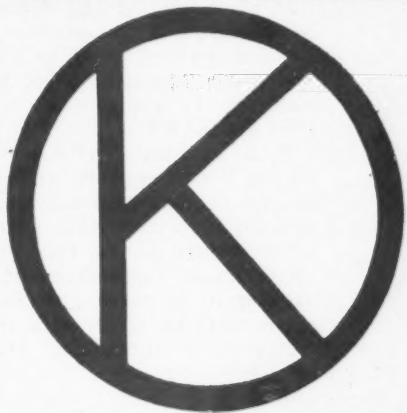
Paul G. Hoffman, Studebaker president, announces that E. E. Richards has joined the Studebaker Corp. as assistant to the president. Richards, who is 36, is a graduate of Dartmouth College and the Harvard Graduate School of Business Administration.

IMPERIAL Automotive Products

BRASS FITTINGS • TUBING • TUBING SERVICE TOOLS • BATTERY CHARGERS • WALLETS • TESTERS • WELDING OUTFITS AND SUPPLIES

KOETHERIZING

KOETHERIZE



**FOR PISTON
PERMANENCY**

Koetherizing has become the accepted standard method of expanding pistons to correct skirt collapse.

It is an exclusive patented method for restoring pistons to their original factory fit with the greatest accuracy. In most cases it makes piston replacement unnecessary.

Make it a practice, on every ring job, to correct the skirt of the piston too . . . with Koetherizing. Koetherizing, a national field service designed by the makers of American Hammered Piston Rings, is now offered by over six hundred leading jobbers.

*Every
pulled piston should be*
KOETHERIZED

KOPPERS COMPANY
American Hammered Piston Ring Div.
BALTIMORE, MD.

Arthur Walsh Is Named Head of Edison Companies

Upon the retirement of Charles Sumner Williams as chairman of the board of Thomas A. Edison, Inc., West Orange, N. J., and as an officer and director of various affiliated companies, the position of chairman of the board was abolished, but Arthur Walsh, executive vice-president, will succeed to the duties. Williams' retirement has been made necessary by the condition of his health.

Charles Edison, president, Thomas A. Edison, Inc., has announced further

that Walsh is also promoted from executive vice-president to the office of president of the following companies: Edison-Splitdorf Corp., Edison Wood Products, Inc., Ediphone Co., Edison Storage Battery Supply Co., Thomas A. Edison of Canada, Ltd., and Dictating Machine Ediphone Corp.

Service Manual Covers Lifts

Announcement has been made by the Rotary Lift Co., Memphis, Tenn., of a service manual covering maintenance and repair of all makes of air-

operated automobile lifts. Many illustrations are used, showing the different types of construction, and complete repair information covering each type is given. The index is arranged according to the type of trouble being experienced, making easy reference to that part of the manual. Copies are available at a cost of twenty-five cents each.

Chek-Chart Adds to Staff

R. F. Snyder, formerly of the sales promotion department of The B. F. Goodrich Co., has been appointed sales director of the Chek-Chart Corp., and will be located at the Chicago office in charge of sales activities. Snyder handled publicity, advertising, sales and sales promotion work for Goodrich for 11 years prior to joining CHEK-CHART.

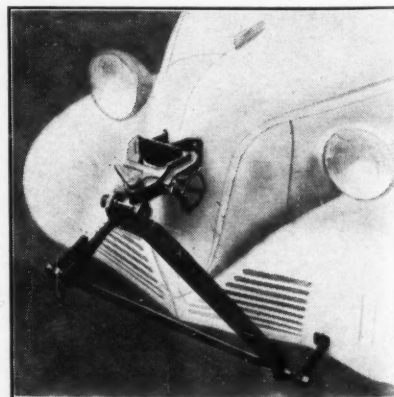
E. E. Rawlings, well-known authority on Diesel engines, and a former Socony-Vacuum staff engineering consultant, joins the CHEK-CHART editorial department in the capacity of research and engineering editor. Rawlings spent 22 years with Socony Vacuum, working direct with the manufacturers of automotive, Diesel and industrial engines.

New Buda Office Opens

The Buda Co. has announced the opening of an office and display floor in Washington, D. C. Located at 1649 Church Street, the new office will be under the direction of Col. H. H. Frost, vice-president. It will be the headquarters, also, of G. C. Humphreys, manager of engineering. E. C. Asher is office manager.

Small Car Tow Bar

The Fergus Motors, Inc., Broadway at 54th St., New York City, has developed a one-man tow bar for use with the Crosley car. Known as the Crosley-Fergus tow bar, it attaches to the front of the car and acts as a bumper when not being used as a tow bar. Brackets for attaching to the large car are designed to fit all bumper styles used on the 1941 models. The tow bar can also be used on Austin and Bantam cars. Price \$28.00.



Above is a reproduction of one of the new displays in the Puritan Brake Fluid spring and summer campaign—a free, five-foot, full-color banner to help you cash-in on the big demand created for this fast-moving product.

PURITAN COMPANY, INC., ROCHESTER, NEW YORK

Dip Your Hands into 6 Billion Dollars!



\$6,000,000,000 a year—that's the annual automobile bill for **SERVICE, MAINTENANCE and PARTS.**

Will you get your share of it this year? It's up to you. You *can* if you have the ambition, the determination and the *necessary shop equipment.* That's where AEP can help you.

Modern equipment is **VITAL** to your success. It will broaden the variety of work you can get—*increase the amount of work you can turn out—and help you build an ever-increasing volume of gasoline, oil, tire, parts and accessory business.* More than 100 leading manufacturers, producing every type of modern automotive

equipment endorse the Automotive Equipment Plan of purchasing, and co-operate in making it available to you. More than 1500 progressive jobbers offer you AEP terms.

Lack of capital needn't hold you back. The down-payment, the number of months and the amount of your monthly payments can be made to fit *your* needs.

In 56,482 cases, shop owners have used AEP to expand and build more profitable business. It's a practical plan that has proved itself over and over. Why shouldn't *you* profit by it? Ask your jobber to help you work out a program. **DO IT TODAY.**



A NEW COMMERCIAL CREDIT FINANCING SERVICE

57% of all the owners of automobiles in the United States earn less than \$31.00 a week. If you want them to spend more money on repairs, *you* have to give them **TIME TO PAY.**

That's what the new **AUTOMOBILE RECONDITIONING PLAN** is for. If you want this business, ask your jobber for details.



Commercial Credit Corporation

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

★ ★ ★



Stewart-Warner Directors Are Returned to Office

At the annual meeting of stockholders of Stewart-Warner Corp., held at Richmond, Va., the seven members of the board of directors were re-elected. These are: James S. Knowlson, Frank A. Ross, Ralph M. Shaw, Irving S. Florsheim, Robert J. Dunham, Thomas T. Sullivan, and Gardiner Symonds.

James S. Knowlson, president and board chairman, told stockholders, "... Although final figures for the first quarter of 1941 are not available, they should show an improvement over the corresponding 1940 period. Uncertainty, however, of general conditions and taxes makes any prediction as to the future a matter of guessing."

New Edition of Chexall

The Chexall Division of The Chex-Chart Corp., 624 S. Michigan Ave., Chicago, Ill., has announced the sixth edition of its Chexall Accessory Manual with complete information covering the 1941 models. In addition to the regular accessory information, the new edition has a front wheel bearing grease retainer interchangeable list, an application list of rebuilt exchange fuel pumps, and revised inspection and installation data on spark plugs, tires, and grease retainers. List price \$3.50.

Motor Wheel Profits Up

Motor Wheel Corp. announces net income for the fourth quarter of calendar year 1940 of \$1,365,968.57 before provision for federal taxes. Federal income and excess profit

taxes provision amounts to \$700,585.97, leaving net profit of \$665,382.60 for the quarter, equivalent to 79 cents per share on the issued common stock.

Net profit after all taxes for calendar year 1940 amounted to \$2,105,914.15 equivalent to \$2.48 per share, compared with \$1,849,238.95 or \$2.18 per share in 1939.

Black Elected Vice President

At the meeting of the board of directors, following the annual stockholders' meeting of the Asbestos

Manufacturing Co., Huntington, Ind., in April, Sidney J. Black was elected vice-president. Black, who is well-known in the automotive industry, will continue to supervise sales of the company to the replacements trade.

Named Sales Representative

William J. Mackert has been appointed sales representative of the General Armature Corp. in New York State and northern Pennsylvania, it has been announced by Frank L. Wolf, sales manager. S. Amoroso has been named New England representative.

Cash-in on tune-up work the sure easy way!

**ELIMINATE GUESSWORK
BY USING A**

Shurhit

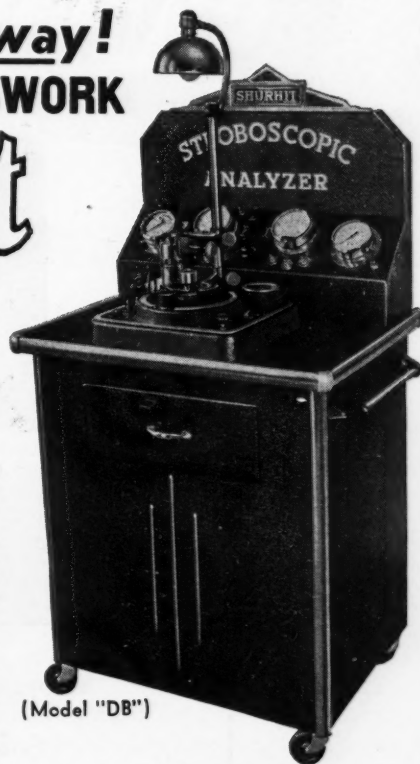
STROBOSCOPIC ANALYZER

Tune-up service is big business... it's profitable business—and with an amazingly small investment it's a major service you can add to your present business. Greater mileage per gallon of gas, and peak performance under all conditions are factors which appeal to car owners, and it has been proven that dealers can sell tune-up service, and make real money, providing they use modern equipment such as a Shurhit Stroboscopic Analyzer.

What others are doing, YOU can do. For example, take the experience of Jack Warren of Warren Automotive Co., Milwaukee. Mr. Warren writes—

"The Shurhit Stroboscopic Analyzer does pay for itself in dollars and cents, and it has increased our tune-up business to an unbelievable extent in a short period of time... We are selling four to five times as many ignition repair parts now compared to what we were selling before we purchased our Stroboscopic Analyzer."

YOU, too, can really go to town with a Shurhit Stroboscopic Analyzer. It takes all the guesswork out of tune-up service and enables you to quickly and easily turn out jobs that are 100% accurate.



(Model "DB")

**ONLY \$11.00
a month**

The Shurhit Stroboscopic Analyzer accurately discloses the true condition of the distributor, as well as the coil and condenser, if the coil on the car is used. It also shows presence of worn bearings, worn shaft, or both; rough cam, uneven cam, weak contact springs, poor condition of contacts, improper spacing of contacts, as well as the performance of the coil and vacuum spark modifier in coordination with governor advance. This equipment enables you to detect trouble, make corrections, check your work and profitably merchandise tune-up service. It also helps sell ignition parts—thus showing you double profits.

Make Big Profits on Small Investment in

SHURHIT IGNITION PARTS



Ask your Shurhit jobber or write us for details on General Ignition Assortments of fast-moving parts...
Contact Points...
Condensers...
Rotors... Caps...
Coils...
Switches, etc.

SHURHIT PRODUCTS, Inc.
Waukegan, Illinois

☐ Send details on Model "DB."
☐ Also send details on General Ignition Assortments.

SIGNED
FIRM NAME
ADDRESS
CITY..... STATE.....
NAME OF JOBBER.....



"Have you been mistreating it? I've never seen one give up so completely."

*A good point
to make.. "IT'S
SAFETY PLATE"*



DON'T PASS UP THIS SALES POINT...



Too few of your prospects understand the difference between Safety PLATE and ordinary safety glass. You'll find this story and the familiar L·O·F trade-mark, the "Mark of Quality," powerful aids in selling cars.

Libbey · Owens · Ford Hi-Test Safety Plate Glass is ground and highly polished to avoid distortion as you look through it. This clearer vision gives added seeing comfort and makes driving safer.

The strong, transparent plastic bonding the two lights of plate glass together assures a maximum of protection.

LIBBEY · OWENS · FORD
HI-TEST SAFETY PLATE GLASS

TUNE-UP SPECIALIST

BY GEO. H. WATSON

THE key argument used by the Jackson Motor Clinic, Jackson, Miss., in selling motor tune-ups is that this operation will pay for itself in saving on fuel consumption. Improved performance of the car and increased driving enjoyment will thus, the customer is told, cost him nothing.

To express better the concern's role as doctor to ailing cars the name was changed recently from Johnston Battery Service to Jackson Motor Clinic. The change was made when the firm moved into a new streamlined home, built especially to accommodate the business which was established in 1933 by E. E. Johnston. H. Odelle Morris is associated with him.

"Some persons treat their cars as they treat themselves," says Johnston. "So long as they can get around, they never see a doctor. They may have an ailment like malaria, which can cut down their efficiency as much as 50 per cent yet they seem to take it as a matter of course.

"It is the same way with an automobile owner. He enjoys the performance of a car while it is new, but this efficiency gradually diminishes. The loss is so gradual that the owner often fails to note the difference. In the end, he is getting not

more than 50 per cent performance out of his car, yet doesn't seem to realize it. That is why we profess to be motor doctors, efficiency engineers, pepper-uppers, if you please. And that is why we say the service we offer doesn't cost the owner a cent. He pays for it in gas consumption whether he consults the doctor or not.

"Recently a salesman reported that, after we restored his car to factory specifications, he saved 28 gallons of gasoline every week or sufficient to pay for the job in less than a month.

(Continued on page 112)

The new shop recently built by the Jackson Motor Clinic at Jackson, Miss., to take care of a growing tune-up business.



Complete Range of Sizes



PAR makes forty individual models, including electric and gas engine drive, two-stage and single-stage compressors, horizontal and vertical models, for high and low pressures—each specifically designed to meet the specialized requirements of the automotive service industry. You will get no "misfit" when you buy...

By Comparison — You'll Buy

PAR

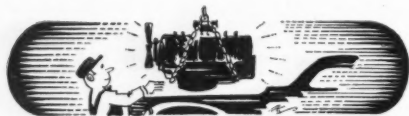
"HOW TO BUY AN AIR COMPRESSOR"... a fact-filled catalog and check list — is yours for the asking. Write for your copy today!

MODERN EQUIPMENT CORP.
DEFIANCE, OHIO, U.S.A.

***F**OLLOWING is a brief digest of important articles appearing in this issue of **MOTOR AGE**. Read the digest and discuss the service procedure with your customers.*

ENGINE RECONDITIONING

This instructive article presents in pictures the methods used by an up-to-the-minute shop in reconditioning



a Ford V-8 engine. Like all shops concerned with the quality of its work, it replaces all vital parts to insure satisfactory performance.

INDIANAPOLIS PREVIEW

Pete De Paolo, a former winner of the annual speed classic, reports on the improvements and innovations on cars that will strive for victory in this year's Memorial Day race. To men who service automobiles, a discussion of the innards of the Indianapolis race jobs is one of the most absorbing topics of the year.

WHEEL ALINEMENT

Complete dope on front-end adjustments on the Nash Ambassador 6 and 8 for 1941. Text and pictures help to simplify the task of adjusting toe-in, caster and camber on these new jobs. It's a piece mechanics will keep handy for reference.

TROUBLE SHOOTING ON HYDRAULIC BRAKES

To help service men detect and correct faults quickly, this article lists the points in a modern brake system



where trouble can develop. Besides its value as a time-saver, the article indicates when turning drums or replacing lining is the only logical remedy.

DEFENSE MECHANICS

With defense industries bidding more actively for skilled men, automobile service shops are beginning to feel the pinch of the labor shortage. In this discussion are described the experience of shops that have made an effort to hold their best men and have so far succeeded. For operators

who are looking ahead, the article is a must.

BATTERY SERVICE

Pushing first-line batteries in the face of low-price competition is a problem that confronts every shop that carries such parts. Every one of them will be interested in this en-

lightening and encouraging study of an all-round service shop that bases its surprising volume on an unusual but sound idea of service.



JOBBER'S OF THE MAY

SERVICING THE MILLIONS of American motor vehicles in the present defense emergency is a problem that concerns the jobber no less than the repair-shop operator. The two are literally and actually partners in the task of keeping these vehicles rolling, a task that gives every indication of becoming more difficult. Better understanding between the partners can do much to simplify the problems of both.

For the jobber, a better understanding of his customer's interests and needs is made possible by a knowledge of the material his customer reads. In **MOTOR AGE**, his preferred trade publication, are the data and informative articles demanded by the maintenance man interested in turning out jobs that keep customers satisfied. The jobber who knows what **MOTOR AGE** is publishing knows what his customers are thinking about.

This digest of the maintenance articles in this issue has been prepared by the editors of **MOTOR AGE** to give the jobber a quick view of the service man's interests, needs, and problems. A better grasp of the material can, of course, be obtained by reading the articles themselves. The jobber who does read them will have in his daily contact with his customers a sounder knowledge of their requirements and viewpoint.

DIGEST MOTOR AGE

HOW'S BUSINESS

A MONTHLY REPORT ON MAJOR ITEMS BY 500 JOBBERS

APRIL, 1941

NATIONAL TOTAL	Good	Fair	Poor	NATIONAL TOTAL	Good	Fair	Poor
ACCESSORIES	Poor			REPLACEMENT PARTS—Cont.	Fair		
Abrasives.....	33	52	13	Water Pump Parts.....	30	56	14
Anti-Freeze.....	3	18	71	Engine Bearings.....	67	31	4
Car Radio Sets.....	7	26	30				
Car Radio Accessories.....	5	20	31				
Chains.....	1	15	75	SHOP EQUIPMENT	Good		
Heaters.....	2	15	67	Battery Charging Equipment.....	36	42	19
Horns.....	3	29	51	Car Lifts.....	5	33	53
Lacquers.....	46	38	14	Car Washers.....	3	21	63
Oil Filters.....	61	47	3	Compressors.....	20	49	27
Oils and Greases.....	20	37	20	Drills (Electric).....	36	45	20
Polish.....	30	55	15	Electric Testing Equipment.....	19	43	33
Seat Covers.....	46	35	13	Jacks (Garage).....	39	52	13
Thermostats.....	1	19	72	Lubricating Equipment.....	22	52	26
				Paint Spray Equipment.....	20	47	30
REPLACEMENT PARTS	Fair			Tire Service Equipment.....	4	24	54
Axle Shafts.....	11	43	43	Tool Kits and Sets.....	32	41	18
Ball and Roller Bearings.....	47	49	9	Valve Refacers.....	13	42	41
Brake Lining.....	54	46	10	Wheel Aliners.....	8	32	50
Bushings.....	24	55	19	Wheel Balancers.....	12	25	54
Chains (Timing).....	14	42	41	Safety Testing Equipment.....	3	26	52
Clutch Plates and Parts.....	52	41	9	Welding Equipment.....	25	44	24
Fan Belts.....	64	46	6				
Gaskets.....	68	35	2	ELECTRICAL UNITS	Fair		
Gears (Rear Axle).....	14	49	33	Armatures.....	27	53	15
Gears (Transmission).....	18	57	21	Batteries.....	28	63	15
Mufflers.....	77	32	1	Cable (Battery).....	39	66	9
Pistons.....	34	43	24	Coils.....	36	59	14
Pins.....	37	55	11	Other Ignition Parts.....	45	57	4
Rings.....	71	29	4	Fuses.....	35	69	8
Radiators and Cores.....	5	26	46	Ignition Wire and Cables.....	42	63	6
Spark Plugs.....	75	38	2	Lamps.....	45	68	3
Springs (Chassis).....	12	40	29				
Valves.....	32	63	6				

MOST ACTIVE LINES

Position of Leaders	Apr. 1941	Apr. 1940	May 1940	Position of Leaders	Apr. 1941	Apr. 1940	May 1940
Mufflers.....	1	2	1	Lacquers.....	11	9	8
Spark plugs.....	2	7	7	Seat covers.....	12	10	9
Rings.....	3	4	5	Other ignition parts.....	13	13	16
Gaskets.....	4	3	3	Lamps.....	14	16	14
Engine bearings.....	5	1	2	Ignition wire & cables.....	15	18	
Fan belts.....	6	6	6	Jacks (garage).....	16	14	19
Oil filters.....	7	5	4	Cable (battery).....	17		
Brake lining.....	8	11	12	Pins.....	18	17	13
Clutch plates & parts.....	9	8	10	Battery charg. equip.....	19		
Ball & roller bearings.....	10	12	11	Coils.....	20		

HOW ITEMS ARE RATED

"Most Active Lines" are chosen on the basis of the highest number of jobber reports indicating "Good" for the items selected among the twenty most active lines. "Activity" as used here has no bearing on volume, so the lists should not be interpreted as meaning the lines on which jobbers are enjoying the greatest volume. Most active lines are those which the greatest number of reporting wholesalers indicate are selling "considerably above normal" in their particular markets.

HOW TO READ THIS CHART

Information from which this chart is compiled is obtained monthly from a selected list of 500 wholesalers. Figures show the number of wholesalers reporting. Normal is taken as average sales for this month during the past few years.

Good—Sales considerably above normal.
Fair—Sales slightly above or below normal.
Poor—Sales noticeably below normal.

VACUUM STARTING SWITCH

This unit, used on the 1941 Buick, is one that requires thorough knowledge of the mechanism. In this illustrated article, the service man is given every detail he needs to service the switch rapidly and correctly.

REPLACING WINDSHIELD GLASS

With body service becoming more and more important as a source of revenue for the service shop, and me-



chanics skilled in this class of work becoming scarcer, smart operators are doing all they can to develop the ability of the men they have now. This picture presentation of the proper method of installing glass in the windshield on the 1941 Plymouth is designed to fit into such a program.

CHEMICAL CLEAN-UP

Perhaps there was a time when a shop operator had an excuse for failing to keep his shop clean, but that day, if it ever existed, passed with the introduction of chemical floor-cleaning solutions. Here are some suggestions on using them to best advantage.

TUNING DISTRIBUTORS

The great accuracy demanded makes distributor work one of the most important steps in tune-up. This article not only details the correct procedure but emphasizes the advisability of using new parts when there is the slightest suspicion of the old ones.

\$12.28 LUBRICATIONS

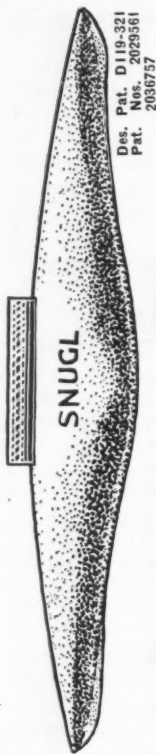
In the shop described, lubrication equipment is used not merely to bring in a substantial profit on its own account, but to give testers a chance to call other service needs to the attention of car owners, with the result that the average repair order in the shop amounts to \$12.28.

REGROOVING BALD TIRES



An article for the future as well as for the present. The fact that the need for economizing on both money and materials will increase under present defense plans makes this article on restoring the tread design of worn tires unusually timely. It describes both method and tools.

Truck and Fleet Operators APPROVE



Snugl Truck Weights

These nationally known new truck weights sell on sight. Truck operators demand wheel balancing as a necessary part of your maintenance service to them. If you don't offer it, learn how today. Snugl Streamlined TRUCK WEIGHTS are designed for heavy duty operation in a full range of sizes from 1/2 lb. to 1 1/2 lbs. Can't rattle or work loose at high speeds. Make steering easier, driving safer, tires wear longer with Snugl WHEEL BALANCING—and your profits will go UP! Wheel balancing the Snugl way makes you a profit on every job and helps you sell new tires and treading jobs as well . . .

Passenger Car Owners need wheel balancing, too. Write today to your jobber or to the factory for details.

Midwestern Auto Parts

Manufacturers

824 East Elm Kokomo, Indiana
Kenneth V. Mills, Western Distributor
423 W. Eighth Los Angeles, Calif.



NEW SPIN-UR-WHEEL CONTROL

The punishment this sturdy new device can take is almost unbelievable! Durable plastic knobs are *riveted* to the base. They simply *can't come off*. Chrome finished base is a heavy metal casting. Take up spring prevents rattle and wear. Band type offers quick installation on all steering wheel rims.

Cut-Away view No. 110



NEW CARTONS AND DISPLAYS

New packages and one dozen displays assure speedy, profitable sales. They shout "QUALITY" in every detail. You'll also get more of the big Cigar Lighter and Replacement Cartridge business with the new SINKO Automatic. Cartridge contains both heating element and thermostat. Makes most Lighters automatics. **Order now, or send for new catalog and price list.**

PRECISION
ENGINEERED

Sinko

MODERATELY
PRICED

AUTOMOTIVE SPECIALTIES

SINKO TOOL AND MANUFACTURING COMPANY

351 NORTH CRAWFORD AVE. • CHICAGO, ILLINOIS

WHAT'S YOUR BRAIN



Here are 20 questions on the automotive service business, its customers, its problems, its merchandising methods. The answers to these questions have eye-opening meaning for the alert service man, for they are 20 clues to a better business.

From a possible score of 100, deduct 5 for each question missed, and then rate yourself on the following basis:

90-100....Excellent. If business isn't good, it isn't because you don't know all the answers.

80-90....Good. You probably got caught on a couple of the technicalities. But, then, these technicalities were all worth knowing.

70-80....Fair. But are you satisfied to do just a "fair" amount of business?

60-70....Borderline. Be sure to read all future issues of MOTOR AGE from cover to cover. They'll help you pull up this rating.

Below 60....All we can hope is that there are no owners or service managers in this group.

1. Estimate within 1,000,000 the number of motor vehicles registered in the United States.
2. While we think of our service business as coming primarily from the passenger cars in this country, still there is an astounding number of light trucks of three-quarters of a ton or less whose owners have no service facilities of their own. Have you any idea of how many of these trucks are therefore dependent upon automobile dealers and independent service stations for maintenance?
3. What amount is spent yearly by the average passenger car owner from parts and accessories?
4. What are the three services most frequently purchased by motorists?
5. How many makes of cars were displayed in the 1940 National Automobile Show in New York?
6. If each of the 87,400 service stations cared for an equal number of the passenger automobiles in this country, how many would each station service?

RATING ON THIS TESTER?

ASKS ROSE LU GOLDMAN

7. On the other hand, if all the service business were divided on the basis of dollar value, and each of the 130,000 stations were to share equally, what would be the gross service sales per station, per year?
8. What car won the Gilmore Economy Run Sweepstake in 1940?
9. In what three ways can you benefit from the national advertising on the lines you carry?
10. What is "related selling" and how can it be applied in your business?
11. Can service men and pump attendants suggest customer needs without offensive "high pressuring"?
12. Name three ways of calling the attention of the customer in your shop to some accessory or service you are featuring.
13. How many Model T Fords were still in service at the beginning of this year?
14. What is the average net profit of an automotive establishment in percentage of sales?
15. One of the boys was cleaning a dirty assembly by scrubbing it with gasoline and a brush, when a new man in the shop suggested a much cleaner, quicker and better way of doing the job. Do you know a method he might have suggested?
16. Give two reasons for keeping the motor, chassis and underparts free from dirt and grease.
17. Far-seeing people in the automotive industry are interested in reducing the automobile accident rate. Can you name three ways in which dealers and service men can help in this work?
18. What is the fastest speed ever attained by an automobile?
19. Unaware of some paint smeared on his overalls, one of the mechanics got it on the upholstery of several of the cars he was driving around the shop. When the damage was discovered, the paint had already dried; could it be removed? If so, how?
20. The following term is frequently mispronounced, and yet it is pronounced just as it is spelled. Which of the following spellings is correct?
(a) Exhillerator (b) Accilerator (c) Accelerator
Answers appear on Page 122.

FIRST AID to Shop Profits

Turning out good repair jobs is profitable business, because they build steady patronage like nothing else will! And Kester Cored Solders are a mainstay to good shopwork—they are easier to handle, take less time, make permanent, neat repairs.

Kester Cored Solders are virgin alloys, with self-contained pure fluxes, scientifically controlled as to kind and amount to do any soldering job perfectly.

Keep these Kester Cored Solders on hand in your shop all the time—Kester Acid-Filled for general repair work; Kester Radiator for easy, permanent radiator repairs; Kester Rosin-Core for all electrical and radio work; and Kester Body for profitable body work. You'll find these special Kester Cored Solders are your first aid to shop profits.

Get them from your jobber.

KESTER SOLDER COMPANY

4242 Wrightwood Avenue

Chicago, Illinois

Eastern Plant: Newark, N. J.
Canadian Plant: Brantford, Ont.



**STANDARD
FOR
AUTO
REPAIRS**

KESTER CORED SOLDERS

TUNE-UP SPECIALIST

(Continued from page 107)

We have many similar reports. Ten days after a customer leaves our place we write him, asking if he notices any fuel saving or other improved performance of his car. In addition, we ask him to return after 3000 to 5000 miles for an additional check-up. We want the improvement to continue for a reasonable time.

"We make no charge for diagnosing a car's need; it is only for putting it in A-1 shape that we make a reasonable charge. Yet we have to keep

harping on the value of a tune-up even to get owners to bring their ailing motors around for a check-up. Of course, ability to pay has something to do with it, but more often the owner doesn't realize the poor performance he is getting. That is why it is our function and that of other tune-up shops to keep reminding him of the need. We have a budget plan of payment to fit the man of small means, and here again we can almost assure him that his fuel savings will

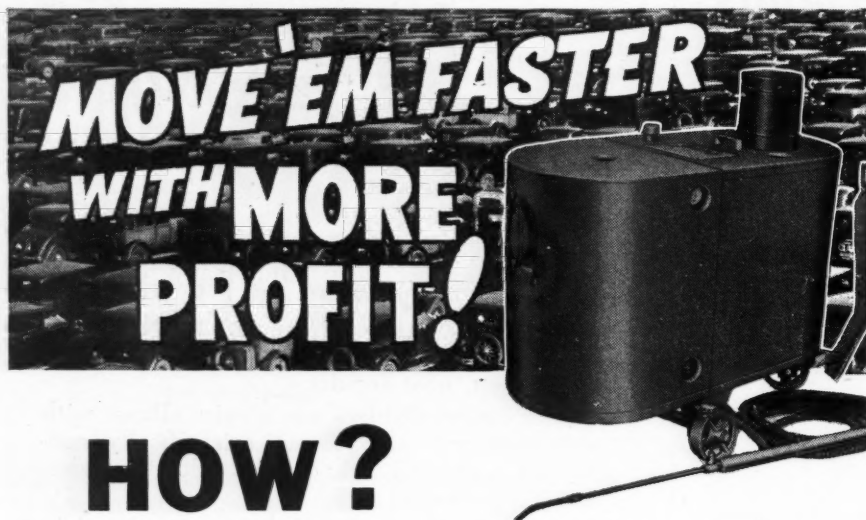
pay the bill, so he is really getting something for nothing."

Like a good doctor, Johnston finds a motor diagnostician must keep studying to keep up with the latest scientific developments in the field. The first time he sent one of his men off to a carburetor school the knowledge he gained increased business 400 per cent in the shop in just a few months. So he sent the man off to take another course, and finally went for a week himself.

Today Johnston has four graduates of factory schools in addition to himself. These include his partner, H. Odelle Morris, who holds degrees from Carter Carburetor factory, the Packard Cable Division of Auto-Lite and several others. He is the precision man of the organization. In addition, there is a factory-trained valve and brake technician, who is a graduate of the Barrett Brake Equipment Co., of St. Louis, a carburetor expert, and one who specializes in starters, ignition, generators, batteries and voltage regulators.

For the factory-trained men, the firm provides the latest machines and tools for motor analysis and repair. These include an exhaust analyzer, an rpm indicator, an oscillograph and distributor specifications on all cars, an ignition timing motor gauge, a generator-output checker equipped with voltage regulator, a spark-plug cleaner, a machine for undercutting generator commutators, a ratchet screwdriver for removing field coils from generator and starter housing, and a lathe for cutting down armatures. In addition, the concern recently installed a battery charger that can recharge a battery in 30 minutes. This white-enamaled, nickel-trimmed machine may be moved about on rubber tires from one car to another. It eliminates the trouble and expense of rental batteries.

The shop also uses to advantage a special test-board instrument developed by Morris, with which it is easy to test and correctly set any voltage regulator.



● When used cars are really CLEAN—as only HYPRESSURE JENNY Steam Cleaning can make them—their greatly improved appearance means quicker turnover for you—**plus** a proven additional profit of \$15 to \$50 per car!

Further, you **save** up to 40c out of every mechanic's payroll dollar on repair jobs. Steam Cleaning **before** repairs eliminates the grease and dirt which ordinarily retard the mechanic's productive work by as much as 25 minutes out of every man-hour.

And that's not all! With HYPRESSURE JENNY you can sell added cleaning services with lube and wash jobs—engine and chassis cleaning jobs that will add from \$1.50 to \$3.00 per job to your revenue. Investigate this triple profit opportunity now—send in the coupon **today**.

HOMESTEAD VALVE MFG. CO.
P. O. BOX 95 CORAOPOLIS, PA.

O. K.—Send that Survey.

We recondition, repaint, repair.....cars or trucks monthly.

We employ.....mechanics on dirty, greasy repair work.

NAME.....

ADDRESS.....

SEND FOR THIS
FREE SURVEY
TODAY!

SURVEY

New Tire for Free-Rolling

Tractor Wheels Developed

Designed for service in the vast market represented by the 60,000,000 free-rolling wheels on America's farm implements, a new farm tire is announced by The B. F. Goodrich Co., Akron, Ohio.

Augmenting the trend toward the almost exclusive use of rubber tires on wheels of new farm tractors, the new implement tire permits the movement of farm vehicles over paved highways for interfield work with savings in operating time and cost.

Available in 14 sizes, ranging from the 4.00-12 to the 11/24-24, the new tire features a thick, heavy tread for long wear and deep self-cleaning circumferential ribs to prevent side-slip.

Safety Club To Promote Careful Truck Driving

To promote safety on the highways of America through more careful truck driving, a new national organization to be known as the Star Drivers Club was announced recently in New York. Plans for awarding special recognition to truck drivers who pile up unusually good safety records were released by the sponsor of the club, United States Rubber Co.

Carrying approval of Harold J. Jones, chairman of the safety committee of American Trucking Association, the club will give insignia ranging up to a diamond pin to these men, in addition to a safety award certificate and membership card. The certificate will carry the signature of F. B. Davis, Jr., president of the United States Rubber Co., and of Jones.

Minimum requirements for membership in the club will be a 300,000-mile record of operation without accidents for inter-city drivers, or 100,000 miles within the city or suburbs.

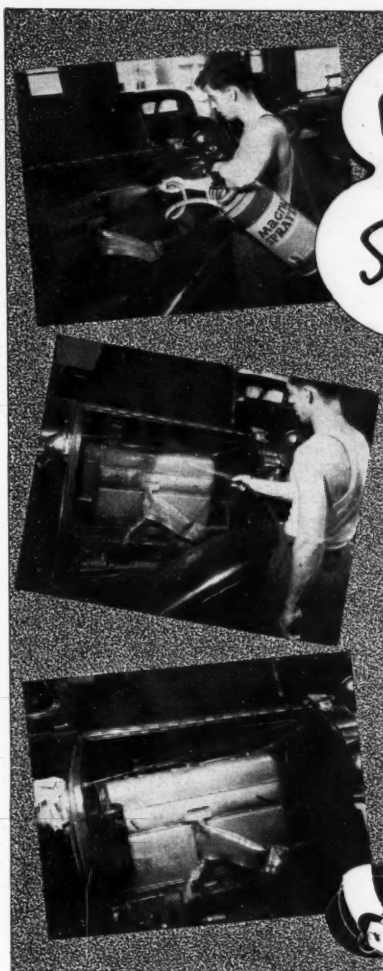
Worker Students Increase

An increase of 50 per cent in the number of Pontiac employees enrolled in the "spare time" courses sponsored by General Motors Institute is cited by H. J. Klingler, president of Pontiac Motor Division, as proof of the desire of automobile workers to improve their professional knowledge.

Among the courses elected by Pontiac employees during the winter were trade mathematics, drawing and blueprint reading, material control methods, lathe operation, technical algebra, mechanical drawing, tool and cutter grinding, shaper operation, hydraulics, trade geometry, acetylene welding, die design and psychology.



"Couldn't we wait till later to find out about that engine knock?"



CLEAN MOTORS...a MUST for Servicing and Reconditioning

You can't do a good servicing job anywhere on a motor unless it is really clean. And any shop that reconditions a car without making sure that the motor block is spick and span is only fooling itself. It's mighty easy to get a clean motor in a few minutes and it costs next to nothing. That is, if you use

MAGNUSOL

Just spray it on. Let it soak in. Then rinse off with a pressure hose. You'll have a really clean motor.

Magnusol is not only harmless to all motor parts and paint, and easy on the hands, but it ends the serious hazard of using gasoline, benzine or other inflammable volatile solvents. With the Magnusol mix you do not even have to disconnect the ignition lines. It's economical because you use the concentrated cleaner to mix with your own kerosene, one part to eight, instead of paying for kerosene or other solvents sold in a ready mixed compound. Clean 'em with Magnusol.

GET YOUR COPY OF THE AUTOMOTIVE CLEANING HANDBOOK

It tells you not only how Magnusol can speed up servicing and save money for you, but how the other Magnus "Reconditioners" can serve you along the same lines.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

239 South Avenue

Garwood, N. J.

MAGNUS CLEANERS



At last! FADED CONVERTIBLE TOPS RE-DYED WITH NEW SUNFAST ARIDYE BLACK!

LOW COST. EASY TO APPLY. It is now easy to restore faded convertible tops to a deep, attractive black with a new coloring material. The Aridye black is inexpensive, and it offers you big profit possibilities! Used convertibles are made much more appealing—easier to sell—with redecorated tops. And Aridye black is ideal for restoring faded tops as a repair service.

NOT A DRESSING—QUICK DRYING. Aridye black for re-dyeing convertible tops is not a dressing nor a varnish. It is a new type of pigmented solution, which has been used for three years with great success in the textile industry, and now it has proved its advantages as a dye for convertible tops.

Aridye black is easily applied with an ordinary spray gun. It is non-flammable. It dries rapidly to a handsome, deep black.

WRITE TODAY for more information on Aridye. Or, better still, see for yourself how this remarkable new product will perform for you and send now for a trial order. Use handy coupon below.

ARIDYE CORPORATION FAIR LAWN, NEW JERSEY

ARIDYE CORPORATION,
FAIR LAWN, NEW JERSEY

- ☐ Please send me free information on Aridye black for re-dyeing convertible tops.
check enclosed
☐ Please send me ☐ quarts of Aridye C.O.D.
black. (Price \$1.50 per quart, enough for two spray coats on larger size convertibles.)

NAME,


ADDRESS,

PAX GASKETMOLD

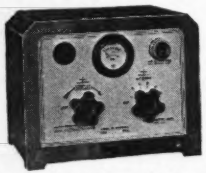
DIFFERENT! TRY IT!

One trial will prove the superiority of this "scientific formula" gasket compound. Makes an absolutely leak-proof seal. Not affected by gasoline, water or anti-freeze solutions. Withstands highest temperatures. Never sets hard—JOINTS EASILY SEPARATED. Used without gaskets or with new or old gaskets. Prolongs gasket life. For all metal-to-metal joints—pipe threads, hose connections, etc. **TRY IT!** Send jobber's name if he can't supply you.

Territory open for live Representatives.
JOHN S. MCKENZIE, Mfr., RUTHERFORD, N. J.



BUY NO BATTERY CHARGER




Until You Have Investigated The **VALLEY SUPERDUTY CHARGER**

- Fully Guaranteed for Two Years—Valley, modernized superduty chargers will give you the utmost in value . . . enable you to cash in on the big profits in battery charging. Valley chargers are easy to operate . . . no moving parts . . . connecting to the lighting circuit. Low in operating cost. Order yours today.

Model SG-12 charges 1 to 12 6 volt batteries—\$28.00.

Valley Electric Corp.
4221 Forest Park Blvd., St. Louis, Mo.





7" PORTABLE ELECTRIC SANDER

High speed, general purpose sander. For metal finishing, removing scale and rust, smoothing welds.

**THE UNITED STATES
ELECTRICAL TOOL CO.**
Cincinnati, Ohio

For running-in new and rebuilt engines use auxiliary lubricants containing "dag"* Brand colloidal graphite.

Acheson Colloids Corporation

Port Huron  Michigan

*REG. U. S. PAT. OFF.

KEX TIRE PLUGS



- Stem compressed in needle point metal quill for easy insertion.
- Dynamic hole stoppers for punctured casings.
- Add months of mileage to tire service life.
- Sealing stems, 1/4", 3/8", 5/16". Patch heads 2 1/4", 4".

Automotive Wholesalers Sell KEX.

The WEDLER-SHUFORD CO. ST. LOUIS, MO.

American-Trained Chinese Youths Helping Country

A hundred young Chinese students who received a technical education a few years ago in Henry Ford's factories today are using this training to help put China back on her industrial feet.

The Ford-trained youths are first lieutenants to Rewi Alley, the New Zealander who started establishing "vest pocket" industries to revive a China left demoralized by military invasion.

Alley and Indusco, as his Chinese Industrial Cooperatives are called, have made such tremendous strides to China's benefit that world leaders believe this movement to be the most dynamic force now at work in the Orient.

The part played by Henry Ford in this picture is significant. Virtually all of the technical direction of the Indusco movement is provided by the Chinese students trained at the Henry Ford Trade School. Between 1922 and 1930 these young men came to America and spent several years learning mechanics and engineering in the Ford Rouge plant and its school system.

A plan worked out between Ford and Joseph Bailie, a Californian who went to China as a missionary and engineer, made the technical education possible for the Chinese students. Bailie wrote the automobile manufacturer, persuading him to help supply to a select group of 100 students the type of training China needed most. Ford agreed to the proposal, enrolled the boys in his Trade School, and sent them back to China a few years later as trained mechanics.

Builds Plane Engine Plant

Final contract for the remainder of construction work on The Studebaker Corp. aviation engine plant at Fort Wayne, Ind., was awarded to Consolidated Construction Co., Chicago. The contract covers completion of three buildings at Fort Wayne—the main plant, industrial relations building and chip house—as well as miscellaneous installations in these.

There's only One BURN-OUT PROOF DIRECTIONAL SIGNAL SWITCH

and we make it!



In complete sets of Signal-Stats or as a replacement switch.
ASK YOUR JOBBER

Pat. Pend.

SIGNAL-STAT CORPORATION
68 JAY STREET BROOKLYN, N. Y.

NEW SpeedWay 1/2" No. 89 DRILL

Full size, full weight, full capacity. Specially wound, high torque 115 V Universal 500 r.p.m. SpeedWay Drill Motor. Forced air cooling, oilless bearings, new natural grip breast plate and removable side handles. Streamlined die cast case. If your dealer can't supply, order direct on 10 day trial.

\$24.50

Circular Free

SpeedWay Mfg. Co., 1880 S. 52nd Ave., Cicero, Ill.



WORKS LIKE A Stone YET IT'S Flexible!

Flex-Stone

CONTACT POINT DRESSER

Made of hardest abrasives to smooth down hardest points. Bends, twists into tight corners, but will not break. Won't short circuit. Just try FLEXSTONE . . . you'll like it 100%!

Send for Rimac Catalog

RINCK-McILWAINE, INC.
16 HUDSON ST. NEW YORK, N. Y.

Handy SUPER SERVICER

Quick Charger

Compact portable Tester, Booster and Quick Charger. Tests battery in 1 min.; Charges FAST and SAFELY in car. Specify 115 or 230 volts when ordering.


Complete with Bulbs, Leads and Clips **\$180.00**

BALDOR ELECTRIC CO.
4375 Duncanson Ave., ST. LOUIS, MO.



? DO YOU KNOW ?

. . . what motor oil Pan American Airways has used exclusively for over 500 million passenger-miles?



WOLF'S HEAD

100% Pennsylvania 35c a quart
Wolf's Head Oil Refining Co. Oil City, Pa.

OUTSTANDING

performance in the
Automotive Industry



SKF
BALL AND ROLLER BEARINGS

HERE'S A HORSE OF A DIFFERENT COLOR



Thermoid
Thermoidized
**PRE-STRETCHED
FAN
BELTS**

STOP TROUBLE BEFORE IT STARTS

A DELUXE HORN for Auto, Bus, Boat and Truck



Investigate the profit possibilities of Buell horns in your community. Their vibrant, melodious signal increases driving security. Sound range up to 10 miles. Here's a quality horn that's a profit maker. Send for literature—today.

BUELL MANUFACTURING CO.
2973 Cottage Grove Ave., Chicago, Illinois

General Motors Sales

Increase In First Quarter

March sales of General Motors cars and trucks in the United States and Canada, including export shipments, totaled 247,683 compared with 193,522 in March a year ago. Sales in February were 226,609. Sales for the first three months of 1941 totaled 709,714 compared with 549,182 for the same three months of 1940.

Sales to dealers in the United States totaled 226,592 in March compared with 181,066 in March a year ago. Sales in February were 208,214. Sales for the first three months of 1941 totaled 653,384 compared with 506,449 for the same three months of 1940.

Sales to consumers in the United States totaled 253,282 in March compared with 174,625 in March a year ago. Sales in February were 187,252. Sales for the first three months of 1941 totaled 608,702 compared with 419,308 for the same three months of 1940.

One-Third of All Vehicles

Ever Made Are Operating Today

More than one-third of all the automobiles and trucks ever produced in the United States are still traveling the highways, the American Petroleum Industries Committee declares.

Since 1900, the Committee points out, almost 80,000,000 motor vehicles have been produced by the American automobile industry; prior to that date only a few thousand vehicles were manufactured. Thirty-seven per

cent of these vehicles, 30,600,000, were registered and in operation last year, and about 23 per cent of these are estimated to be 10 years or more old.

Although more used motor vehicles are sold each year than new vehicles, the Committee finds that obsolete vehicles are being scrapped at a rate of two to two and one-half million vehicles annually.

Handles Truck Sales

Appointment of Don G. Furlong as regional truck manager of the Detroit region, which includes Michigan, northern Ohio and Indiana, is announced by L. F. Van Nortwick, Regional Manager, Dodge Brothers Corp. at Detroit.

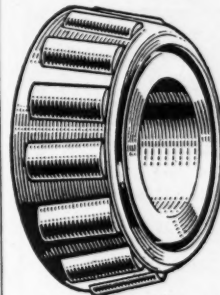
For the last five years Furlong has been truck manager for Dodge in the Detroit city area.

Named Regional Manager

According to word received from C. S. Fletcher, sales manager of the Studebaker Corp., F. A. Thomas, until recently on special assignments at the home office, has been elevated to the post of manager of Studebaker's Cleveland regional office. Thomas' automobile experience dates back to 1915 when he became a retail salesman.

PRATT TAPERED ROLLER BEARINGS

The Perfect Replacement



Line for all
makes of

- Passenger Cars
- Trucks
- Buses
- Tractors
- Farm Machinery

Recognized as the Standard Replacement Bearing by Jobbers and Servicemen everywhere.

ESTABLISHED 1893

WM. E. PRATT MFG. CO.
JOLIET, ILL.

Heads Factory Sales

William C. Gulick has been appointed manufacturers' sales representative of The B. F. Goodrich Co. in its Detroit office, it is announced by G. E. Brunner.

Extracts Oil and Grease FROM CEMENT FLOORS

Leaves Driveways
and Lifts

"New Stone" Clean



List Price \$12.00

—40 lb., 5-Gal. Size

BEWARE OF PARTLY DILUTED
IMITATIONS OF GUNK. DON'T
BE FOOLED — GET THE GENUINE
GUNK—IT COSTS LESS!

In stock at leading automotive supply companies . . . if they cannot supply you, send postcard for name of nearest jobber and free catalog information.

Sold as a Concentrate

Dilute with 9 parts low cost kerosene—this 5 gal. size makes 50 gals. effective ready to use degreasing solvent.

CURRAN CORP.
MFG. CHEMISTS, Malden, Mass.

Not in stock at my jobber . . . attached to my Business letterhead is my check, or M.O., on the condition that you ship me a 40-lb., 5-gallon size, GUNK at dealers net cost \$7.20 (\$8.00 west of the Mississippi) by FAST PREPAID AMERICAN EXPRESS-free of charge.

NAME

ADDRESS

CITY..... STATE.....

BUY
AT THE SIGN
OF THE LION



LION AUTO PARTS & MFG. CO., INC.
1920 S Michigan Ave., 2214-20 Main St., 1239 Osborne St.
CHICAGO DALLAS MONTREAL

DEALERS • JOBBERS • AGENTS
Make Money—Season Just Starting!
Extremely liberal discounts and commissions!

sell CHAMPION
Wonder Cream Polish

contains no abrasives or wax

Cleans, polishes, protects. Removes all stains, restores high lustre with light rubbing, leaves protective coating of hard dry oil. One operation—one hour. Lasts for months!

Insure rapid, consistent profits with


CHAMPION POLISH

366 Canal Place

Bronx, N. Y.

TRADE MARK
NOC-OUT
HOSE CLAMPS

THE HOSE CLAMP
WITH THE
THUMB SCREW

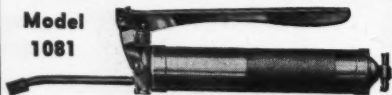


For fast, dependable hose connections, use NOC-OUT Hose Clamps . . . standard in the automotive industry for many years for their leakproof, trouble-free sealing features. Quick tightening thumb screw provides equal pressure all around. Type "A" Adjustable . . . fits many hose sizes. Type GBB heavy duty, solid band for Booster Brakes. GSHH for all heater hose. Type HP for all high pressure air and gas lines. Sold by dealers and jobbers everywhere.

WITTEK MFG. CO.
4305 W. 24th PL., CHICAGO, U.S.A.

New LINCOLN
KLEENSEAL LEVER GUN

Model
1081



Price only \$4.00

Ask your Lincoln jobber salesman, or write us for details on Model 1081 and other items in complete line which includes hand guns, lever guns, air and electric operated lubricant dispensing units, and full line of grease fittings.

LINCOLN ENGINEERING COMPANY
General Offices, St. Louis, Mo.

SPEAKER
MATCH
PATCHES

You make more friends, higher profits, with Speaker "MATCH PATCH" Guaranteed TUBE REPAIRS. Unsurpassed in Quality and Performance. Hermetically sealed in patented MOISTURE-PROOF PLOFILM. Instant Lighting Wick Fuse. Fit any clamp. Box of 50's—\$1.45. Order from your Jobber TODAY!

J. W. SPEAKER CORPORATION
1661 North Water Street
Milwaukee, Wisconsin

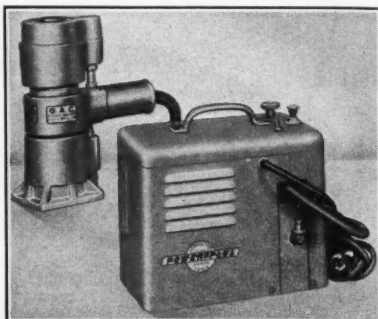
ANSWERS
to
BRAIN TESTER
(Appearing on page 110)

- 31,468,887—more than three times as many as in all Europe.
- About 1,000,000, or an average of eight per service station.
- \$24. Multiply that by the number of your service customers and you will have a handsome parts and accessory business.
- An analysis by a leading car manufacturer of the job tickets of his dealer service stations showed that 40 per cent of all the jobs included lubrication. Washing and brake adjustment were the next most frequently purchased services coming up on 16 per cent and 10 per cent of the job tickets.
- 18 — Buick, Cadillac, Chevrolet, Chrysler, Crosley, DeSoto, Dodge, Ford, Hudson, Lincoln - Zephyr, Mercury, Nash, Oldsmobile, Packard, Plymouth, Pontiac, Studebaker, Willys.
308. Are you getting your share?
- \$53,000. Again, we asked if you've staked your claim.
- A custom-built Lincoln.
- (1) Coordinate your displays with these advertisements, (2) Send out direct mail pieces calling attention to the advertisement, and telling of your ability to furnish them with the article or service mentioned, (3) telephone your clients and call attention to the ad, as you did with the direct mail pieces.
- Druggists have long since learned to ask the man who comes in for razor blades how he's fixed on soap and talcum. That's "related selling." You, too, can use it. For instance, ask the man who comes in for a lamp bulb how he's fixed for extra fuses, and check his lights, horn, windshield wiper, etc.
- Certainly—service need not mean giving something for nothing. The man who, when checking the oil, notes a worn fan belt and mentions it to the driver is given credit for being part of an alert and up-and-coming organization. He saves the customer inconvenience and perhaps great expenses should the old belt brake in some outlandish place and leave him stranded; and he *does* make a sale of a fan belt.
- (1) signs and banners, (2) prominent display and demonstration, (3) verbal suggestion.
- 193,809.
- 2.2 per cent.
- A degreasing solvent. See MOTOR AGE, page 29, March 1941.
- (1). A coating of dirt and grease is a serious fire hazard, (2) A clean engine improves the appearance of the car immensely, both in the eyes of the owner, or any prospective buyer.

THE TALK OF THE
TRADE

EVERYONE WANTS THIS,
THE NEWEST THING
IN HYDRAULIC JACKS

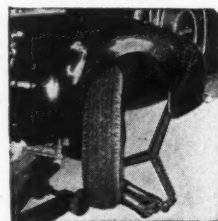
THE SENSATIONAL NEW G.A.C.
AUTOMATIC TWO-SPEED, TWIN-
CYLINDER POWER UNIT



Two high-speed pumps quickly force ram to contact load, then automatically cut out and powerful slower speed pumps lift load. Two cylinders working at all times give continuous uninterrupted flow of power to ram.

HAVE YOU BOUGHT YOUR

H-289
PERFECTION
POWER-PLUS
UNIVERSAL
FENDER
SPREADER?

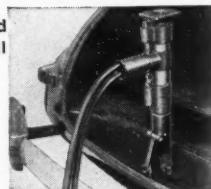


Modern fenders demand it for close work where wide spreading is necessary and for spreading between fender and fender well. Pays for itself on the first six jobs. Closes to 1 1/4" and opens to 19 3/4" with 6" ram travel. \$14.75

YOU CAN'T DO WITHOUT IT

when you need
power in a small
area

THE H-80
PERFECTION
POWER-PLUS
PUSH-PULL SPREADER



for use with Perfection Push-Pull Jack. Ideal for trunks, pushing out sills, etc. Fits into 1" space. Open width 5 1/2". \$8.50.

Order from your jobber or
write for catalog.

G.A.C. MFG. CO.
ASHLAND, OHIO

BLUECROWN
SPARK PLUGS



FINNED SHELL SAVES GAS

Ask your Jobber
MOTOR MASTER PRODUCTS CORP.
4757 Ravenswood Ave., Chicago, U.S.A.
Export Distribution
Borg-Warner International Corp., Chicago

YOU'LL NEVER KNOW

● **THE PROFIT OPPORTUNITY** in Fitzgerald Gaskets until you handle them.

THE FITZGERALD MFG. CO., TORRINGTON, CONN.

FITZGERALD GASKETS

17. (1) Be sure that all buyers are drivers before they take delivery. (2) Check the safety features on all cars that come into your shop for service, and recommend any needed repairs. (3) Boost safety equipment and accessories, lights, mirrors, windshield wiper blades, etc.
18. John Cobb attained a speed of 358.9 m.p.h. in 1939.
19. Yes. Use a cloth saturated in turpentine and rub until paint is dissolved. Then wipe the upholstery with a clean cloth wet with cold water.
20. Accelerator.

Radio Firm Names Kehoe

According to an announcement by E. A. Nicholas, president of Farnsworth Television & Radio Corp., Sam H. Kehoe has been appointed manager of the company's Automotive Division.

Wrapping Being Eliminated By Truck Tire Manufacturers

Dealers and other buyers are now receiving unwrapped truck tires, in sharply increasing quantities, as part of an important industry simplification and conservation program. The elimination of wrapping, of course, in no way affects the quality of the product and the resulting saving in kraft paper is useful.

The national defense program has given a real impetus to industry efforts to simplify production and distribution all along the line. As the result of frequent meetings of the tire industry Simplification Committee, organized by members of the Tire Division of The Rubber Manufacturers Association, several manufacturers of truck tires, who represent a considerable proportion of total industry output, have eliminated wrapping all truck tires. Other companies have stopped wrapping the larger sizes and are extending the practice, and the remaining companies are now considering the question.

Army Gets Compressors


As a part of its broad participation in national defense work, the DeVilbiss Co. is supplying the U. S. Army with approximately 5,000 garage type air compressing outfits. These are for use in the repair trucks which accompany the Army's motorized and mechanized units. The DeVilbiss air compressing outfits are gasoline-engine driven and are adaptable to most varieties of field repair work, including the operation of tools, spray painting devices, and the like.



DE LUXE TEST STAND AND BENCH. Siberian gray, wrinkle finish. Designed to suggest the need of tune-up to your customers. Heavy steel. Dealer price with 7 instruments as shown, \$285.75.

If your Jobber can't supply you
USE COUPON

CALM DOWN 'SARGE'
I'M O.K. WITH MY
SOUTHERN
BRAKE LINING



SOUTHERN
FRICTION MATERIALS CO.-CHARLOTTE, N.C.

MILES of SMILES

WHEN YOU
USE GENUINE
TIMKEN
BEARINGS

THE TIMKEN ROLLER BEARING
COMPANY, CANTON, OHIO

ELECTRO TESTING INSTRUMENTS

THEY ALSO TUNE UP YOUR BUSINESS!

NO up-to-date service station can afford to ignore the value of these instruments as profit-builders. They enable you to render a scientific Tune-up Service, and in so doing give you a definite standing as a Tune-up authority. Result: More jobs come your way—a "Business Tune-up" in the form of increased profits!

A FEW ELECTRO PROFIT BUILDERS

TROUBLE SHOOTER—Complete electrical check-up in 15 minutes. Makes those tough jobs easy.

MIXTURE MASTER—3-minute mixture check. Insures accurate carburetor adjustment. \$39.50.

MOTOR PEAKER—Fastest instrument for tuning motors to peak performance. The poor man's Dynamometer. \$17.50.

CAM ANGLE INDICATOR—Shows contact angle or breaker point dwell without removing distributor. \$27.50.

COILMASTER—Complete 2-minute coil check—high and low speed; tells the coil's true story. \$37.50.

BUY ON EASY TERMS THROUGH CCC

ELECTRO PRODUCTS CO., 621 E. 216th St., New York:
Send literature and prices of Electro Testing Instruments.
NAME
ADDRESS
CITY & STATE.....D

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